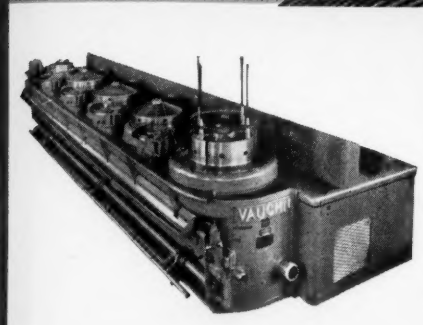
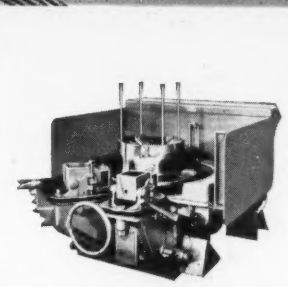
JULY 1947

WIRE AND WIRE PRODUCTS



WHAT IS YOUR MAJOR REQUISITE in WIRE DRAWING MACHINERY?



SPEED? FLEXIBILITY? VERSATILITY?

You get it with VAUGHN!

Yes, every cardinal production advantage is engineered into Vaughn Motoblox and Motobloc . . . and every design refinement for lower maintenance and longer life. Specify VAUGHN Wire Drawing Machinery in your modernization planning this year!

THE VAUGHN MACHINERY COMPANY
Cuyahoga Falls, Ohio, U. S. A.

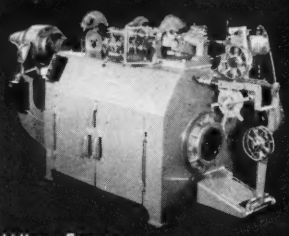
PLETE COLD DRAW-
EQUIPMENT — Con-
or Single Hole . . .
the Largest Bars and
. . . for the Small-
Wire . . . Ferrous,
Ferrous Materials
Alloys.

VAUGHN-MACHINERY
PROFITABLY USED BY LEADING WIRE MILLS SINCE 1860 . . .

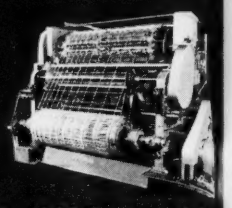
OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

WEAN EQUIPMENT

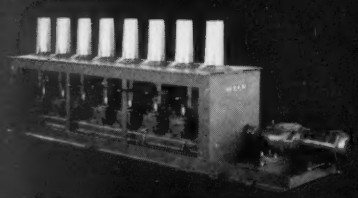
Cleveland Ohio



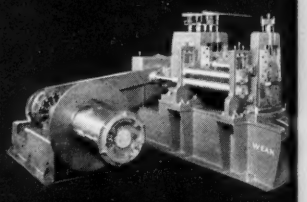
Barbed-Wire Fence Machine



No. 1155 Farm and Fi Fence Machine



8 Block Fine Wire Tinning Take-up Frame



Strip Reel and Slitting Unit

HOLMQUIST BARBED WIRE AND WIRE FENCE MACHINERY

16 Block Wire Galvanizing Frame

COLD ROLLING MACHINERY

For 36" Wide Material and Narrower

MILLS · REELS · SLITTERS · LEVELERS · COILERS
EDGERS · SCALE BREAKERS · SHEARS · SCRAP
BAILERS · CONTINUOUS PICKLING

WIRE MILL EQUIPMENT

WIRE DRAWING MACHINES · PATENTING · GALVANIZING AND TINNING TAKE-UP FRAMES · WIRE FLATTENING · SPOOLERS · NAIL GALVANIZING AND BLUEING FIELD FENCE and BARBED WIRE MACHINES

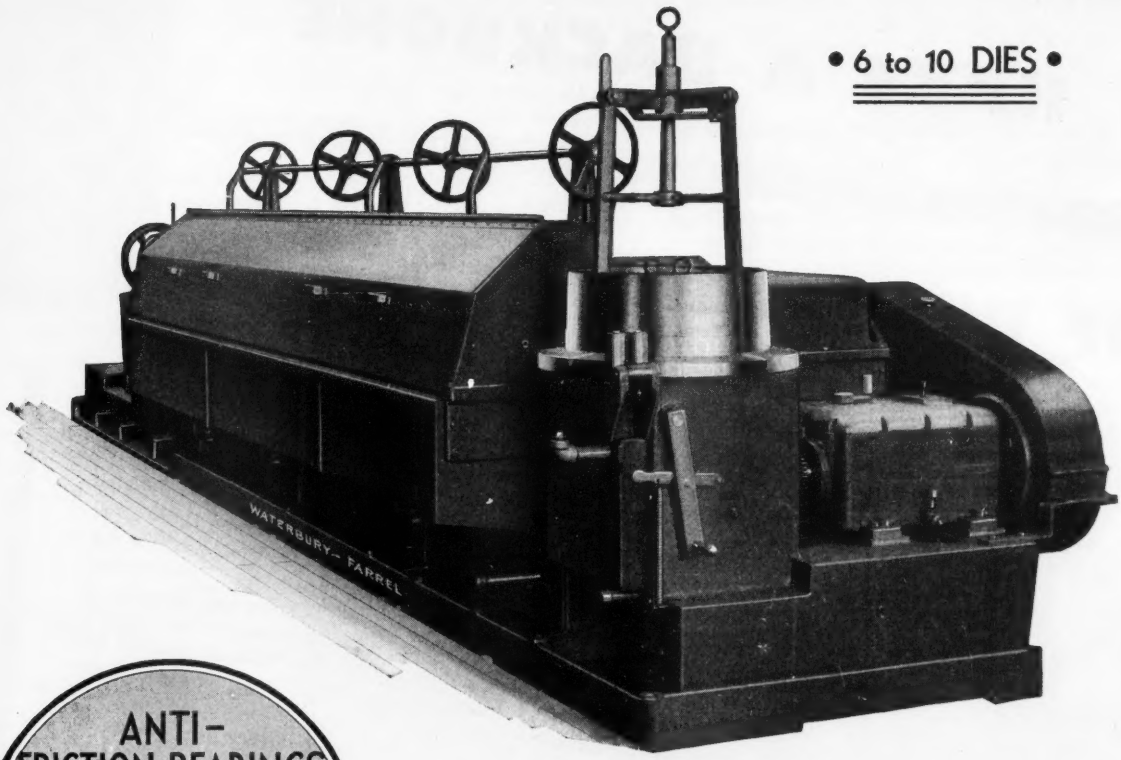
The WEAN ENGINEERING Company, Inc.
WARREN, OHIO

SPECIALISTS IN SHEET TIN & STRIP MILL EQUIPMEN

WATERBURY-FARREL

NO. 1 TANDEM WIRE DRAWING MACHINE - FOR BRASS OR COPPER

• 6 to 10 DIES •



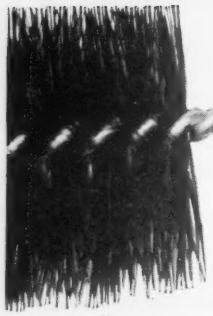
ANTI-
FRICTION BEARINGS
FORCED
FEED LUBRICATION
SPIRAL
BEVEL GEARING

Change gearing provides four finishing speeds with a single speed AC main motor.

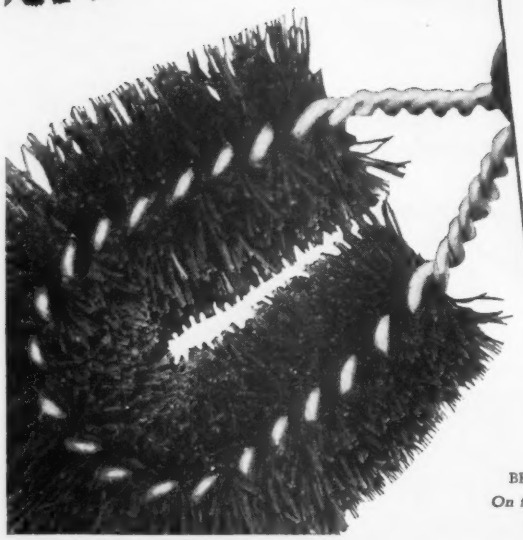
Block driven through a clutch which may be disengaged to permit rotation by hand.

THE WATERBURY FARREL FOUNDRY AND MACHINE COMPANY
WATERBURY, CONNECTICUT U.S.A.

CLEVELAND CHICAGO NEWARK, N. J.



THESE BRUSHES HAVE A BACKBONE OF BETHANIZED WIRE



These twisted wire brushes need not be pampered. Made for a wide variety of cleaning jobs, they stand up under hard usage.

The typical brushes illustrated employ bethanized wire. This backbone of special-quality steel wire assures uniform pitch in twisting, holds the bristles firmly without damaging them, and serves as a convenient handle. There's no danger of injury to the protective zinc coating in the twisting operation because bethanized wire is suitable for the most severe forming jobs. The coating will not flake or peel when the wire is bent or twisted.

Resistance to corrosion is mighty important too, for many brushes are immersed in water in performing their daily cleaning jobs. Here again, bethanized is tops, for 99.9-pct-pure zinc is deposited electrolytically in a coating that is uniform both around and along the wire. There are no thin spots to invite rust—and no tendency for the coating to flake off, because the zinc is perfectly bonded to the steel wire.

When it's ductility of coating and corrosion-resistance you want—pick bethanized, and give it a thorough trial. Ask the nearest Bethlehem district office for detailed information about it.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

WIRE & WIRE PRODUCTS, Vol. 22, No. 7, July, 1947, Publication Office, at 61 Cliff St., New York 7, N. Y. Executive Office, 300 Main St., Stamford, Conn. Published monthly by the Quinn-Brown Publishing Corp., Richard E. Brown, President; R. S. Spengel, Secy. and Treas. Subscription price: U. S., $5.00; Canada, $5.00 per year; 50 cents per copy; Foreign, $7.50 per year. Entered as second class matter, June 14, 1946, at the Post Office, New York, N. Y., under Act of March 3, 1879.

9 WAYS to Improve WIRE DRAWING

FOR more than three years a new coating for wire drawing has been used by many mills instead of lime. The results obtained are outlined in the data below.

MAGNUS METAL COAT #267

on the basis of the results it has obtained, warrants a most careful investigation on your part. Here is what it offers you:

1. **Better Finish** on any wire, particularly on stock drawn for metallic coating and other special finishes, and on bright, rope, welding and tire bead wires.
2. **Reduced Rejects**—rejects caused by scratching and off-size wire are virtually eliminated.
3. **Better Rust-Proofing** than was possible before Magnus #267 was introduced.
4. **Reduced Lubrication Costs** due to the fact that #267 calls for lean lubrication. In many cases savings amount to as much as 50%.
5. **No Hydrogen Embrittlement**—which is eliminated right in the coating solution.
6. **Longer Die Life** on any drawing operation, but most striking on continuous, high speed operations.
7. **No Liming or Baking** eliminates the trouble, expense and mess of the liming operation and subsequent baking.
8. **Cleaner Machines and Surroundings** which result from the elimination of liming. Greatly improved working conditions.
9. **Reduced Overall Drawing Costs** as a result of savings in liming and baking costs and the improvements in product and operations. Ultimate cost per ton of wire drawn is much less than when lime is used in spite of the much higher initial cost of Metal Coat #267.

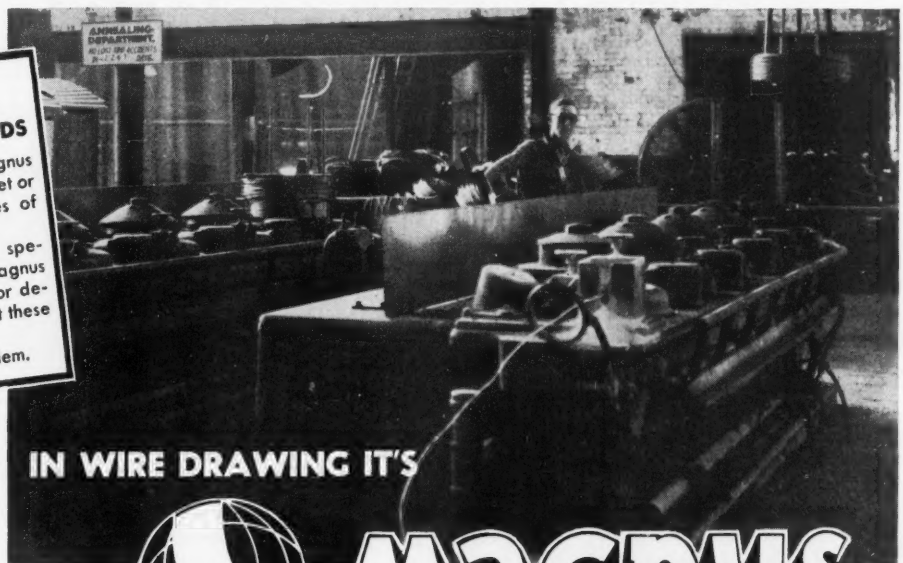
LOOK INTO #267

HEADQUARTERS for DRAWING COMPOUNDS

There's a complete line of Magnus Drawing Lubricants for dry, wet or grease drawing of all types of wire at any speed.

Where requirements are special, the facilities of the Magnus Laboratory are available for developing compounds to meet these requirements.

We welcome your problem.



IN WIRE DRAWING IT'S

Magnus

CLEANERS • EQUIPMENT • METHODS

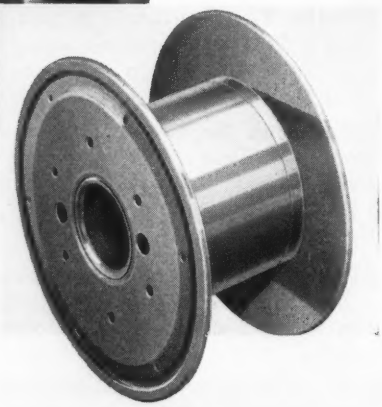
MAGNUS CHEMICAL COMPANY • 188 South Avenue, Garwood, N. J.

Service Representatives in Principal Cities

IN CANADA — MAGNUS CHEMICALS, LTD., 4040 RUE MASSON, MONTREAL 36, QUE.

At the Alloy Metal Wire Co., Inc., Prospect Park, Pennsylvania—0.004″ diameter Monel wire is being drawn at a speed of 2000 feet per minute . . . on a Hubbard all metal electrowelded steel spool.

WHATEVER THE JOB



HUBBARD SPOOLS give balanced true-running performance

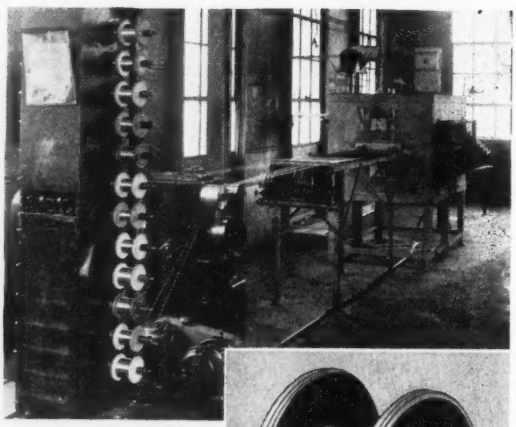
Whatever the job . . . you'll find Hubbard design and construction give you every quality you want in a spool or reel. For high speed operation, such as in the fine wire drawing operation shown above, exact balance assures freedom from wire breakage and therefore steady production.

Hubbard design and construction is also your guarantee against shipment rejects and dissatisfied customers. Inherent ruggedness of Hubbard spools prevents bowing of flanges and "spongy" wire. Illustrated below, Hubbard metal bound spools are being used to spool wire from an annealing furnace, ready for shipment.

Hubbard spools and reels are engineered for your job. Standard types and sizes numbering in the thousands are available to give you quality at minimum cost. Your inquiry is invited for quotations on price and delivery.

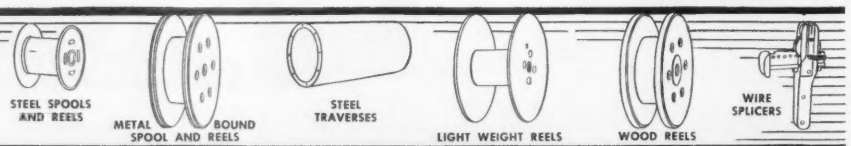
HUBBARD SPOOL COMPANY

1624 Carroll Avenue • Chicago 12, Illinois



Shown above . . . Hubbard metal bound wood spools are used by Alloy Metal Wire to spool wire up to 0.015″ diameter from a strand annealing furnace.

Hubbard



SINCE 1912 MANUFACTURERS OF WIRE DRAWING · ANNEALING · SHIPPING SPOOLS AND REELS

V-R

TANTALUM/TUNGSTEN CARBIDE DIES!

assure you of...

For unsurpassed performance, V-R carbide dies for wire, tubing, bar and rod, cost less than any other die material!

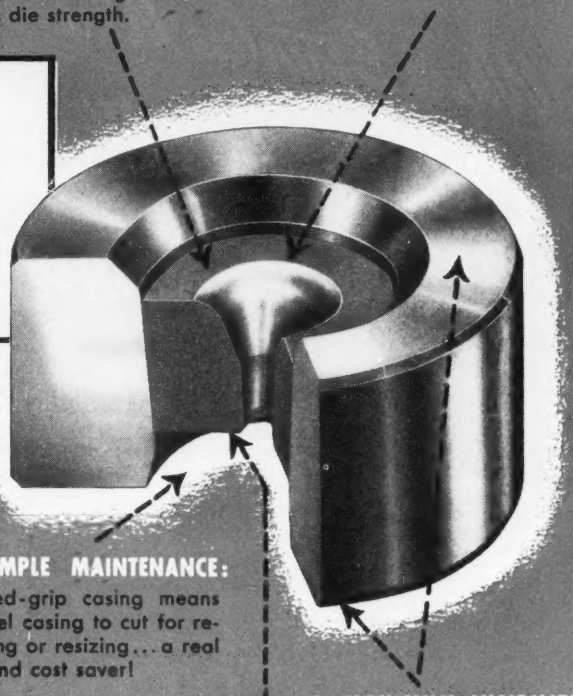
Comparative performance, in addition to exhaustive laboratory tests and wide spread, practical field applications, place V-R carbides at the forefront of carbide die design and development.

REMEMBER TOO, V-R carbide dies are precision engineered by cost-conscious V-R engineers to reduce YOUR carbide die costs.

MAKERS OF WORLD'S FINEST VR Carbides

1. GREATER STRENGTH: Tapered nib design increases absorption of drawing stresses. Side walls of nib are taper-gripped resulting in tremendous die strength.

4. CONCENTRICITY: V-R method of precision die manufacturing assures you of a perfect, concentric drawing surface.

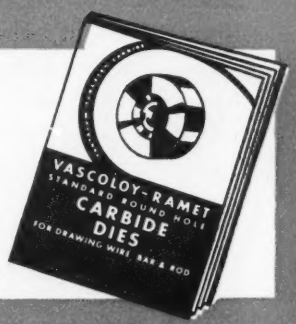


2. SIMPLE MAINTENANCE: Tapered-grip casing means no steel casing to cut for refinishing or resizing... a real time and cost saver!

5. FREE OF POROSITY: Another outstanding achievement is the V-R die quality control for the elimination of porosity in carbide. In addition, V-R Tantalum/Tungsten carbide die nibs take a higher finish than any other die material.

3. MAXIMUM VISIBILITY: Extra wide tapered front and back openings permit simple, easy inspection, better lubrication.

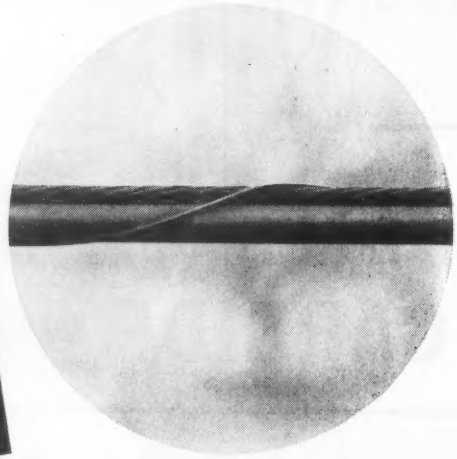
Send for your free copy of the Vascoloy-Ramet Standard Round Hole Die Catalog. Address Dept. WW647.



For increased wire, rod or bar production performance call your nearest Vascoloy-Ramet Field Engineer — the man who knows the solution to your carbide die problems.

VASCOLOY-RAMET CORPORATION NORTH CHICAGO ILLINOIS. U. S. A.
District Sales and Service in Principal Cities
AN AFFILIATE OF FANSTEEL METALLURGICAL CORPORATION AND VANADIUM ALLOYS STEEL COMPANY

Where Stainless Wire Outlasts Coated Wire 3 to 5 Times



Replacing corroded spinning wire in telephone cable suspensions was once a routine job for a western telephone company's trouble-shooters.

Heavily coated wire rusted away fast in severely corrosive atmospheres. Now the company saves money and cuts maintenance costs by using ARMCO Stainless Steel Wire for cable suspensions along rail lines and water routes. Actual tests in these locations show solid ARMCO Stainless Steel wire lasts 3 to 5 times longer than heavily coated wire.

Because of its excellent resistance to corrosive conditions, ARMCO 18-12 Mo Type 316 is used for this spinning wire. The result is less upkeep—much lower costs in the long run.

Perhaps you too can profit by using ARMCO Stainless Steel Wire in your products. Whether you use fine or large wire Armco's Rustless Division can supply it to your exact requirements for temper, finish and tolerances. Write The American Rolling Mill Co., Rustless Iron & Steel Div., 3427 E. Chase St., Baltimore, Md.

Rustless DIVISION OF ARMCO

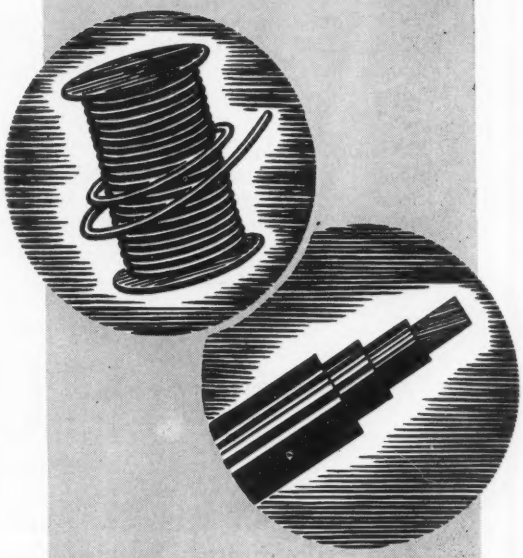
THE AMERICAN ROLLING MILL COMPANY

RUSTLESS IRON & STEEL DIVISION

Specialized

RESEARCH EXPERIENCE

In Insulating Wire Finishes



You are invited to attend a meeting of minds between your engineering staff and ours. The experience of our technical staff embraces all types of insulating finishes to meet the most exacting requirements.

Every formulation is engineered to individual specifications for the particular service required.

Special emphasis should be directed to our non-toxic, flame proof, impregnating compounds and solutions. Also to all types of wire and cable lacquer coatings.

STANDARD VARNISH WORKS

Engineers of Product Finishes

NEW YORK — CHICAGO

SERVING INDUSTRY FOR 75 YEARS

HUDSON WIRE COMPANY

PRODUCERS OF FINE WIRES IN ALL METALS

FINE BARE WIRES

High Brass, Low Brass, Zinc 99.99+ and High Tensile Zinc, Commercial Bronze, Phosphor Bronze, Pure Tin, Lead, Antimonial Lead, Tinsel Lahns, Silver Plated Copper, False Gold and Copper.

Cadmium, Nickel Silver (10%, 18%, 30%), Silver Plated Copper, False Gold and Special Brass and Bronze Alloys to Specification, Metallic Fibre for Packing Purposes, Copper, Bronze, Zinc, Lead and Aluminum.

WIRES FOR METAL SPRAYING

Pure Lead, Lead Alloys, Pure Zinc, Zinc Alloy, Copper, Tin, High Brass, Low Brass, Solder Wire, High Conductivity Electric Wire.

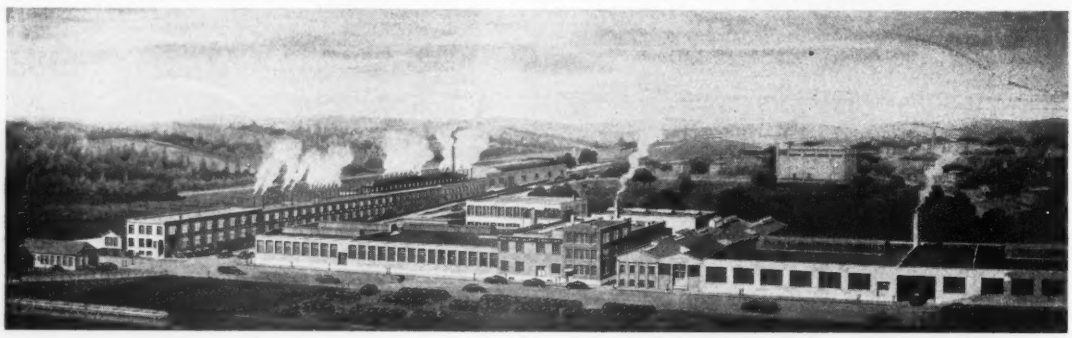
Cadmium, Nickel Silver (10%, 18% 30%), Aluminum, Monel Metal, Phosphor Bronze, Pure Nickel, Commercial Bronze.

Look for the name — **HUDCO** — A guarantee of quality

"HUDCO" specially processed Copper Wire for enamelling purposes is drawn from Selected Copper, insuring the maximum conductivity. This is but one example of the use of the most advanced and approved materials and methods in our processing.

BETTER WIRE AT LOWER COST

Write for Prices and Samples • Let Us Quote on Your Requirements

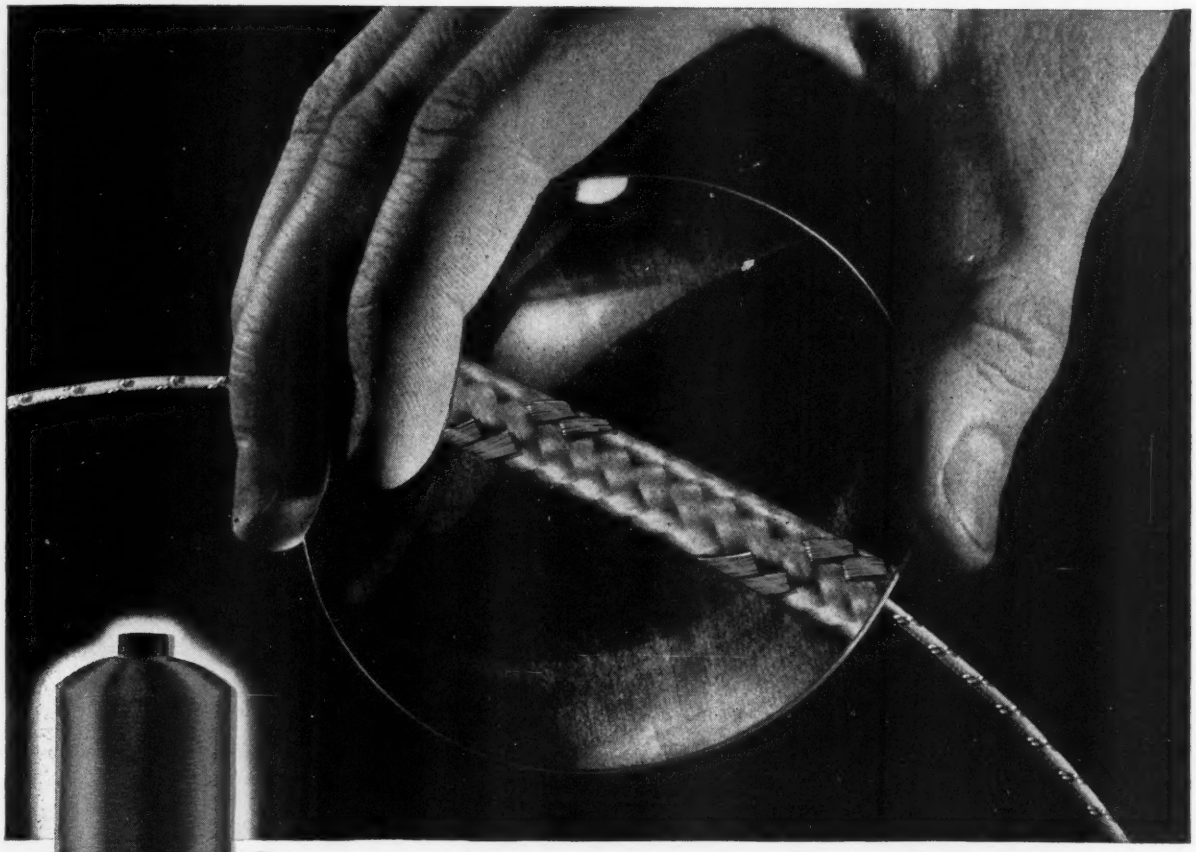


"HUDCO" PLANT AT OSSINING, NEW YORK

HUDSON WIRE COMPANY

Established in 1902 — Successors to Royle & Akin

OSSINING, NEW YORK



DYED FIBERGLAS YARN IN 9 COLORS

Blue • Red • Green • Yellow • Brown • Orange • Slate • Purple • Black

Dyed Fiberglas* yarn is used as marker yarn in the manufacture of rubber-covered wire, nonmetallic-sheathed building cable, flexible cord and fixture wire.

In the production of radio hook-up wire, aircraft cable, etc., Dyed Fiberglas yarn is used as circuit tracers. It is braided over the primary insulation in combination with white yarns or in solid colors to form color coding.

Dyed Fiberglas yarn has high tensile strength and, therefore, can be applied as marker yarn with minimum breakage. And yarns of exceptionally small diameter are available for applications in which space is at a premium.

Dyed Fiberglas yarns will not form gas pockets under high-temperature extruding conditions. They are resistant to chloroform, carbon tetrachloride, Stoddard Solvent and Toluene. Since all Fiberglas yarns are resistant to heat, moisture and fungi, Dyed Fiberglas yarns offer a decided advantage in all applications requiring color.

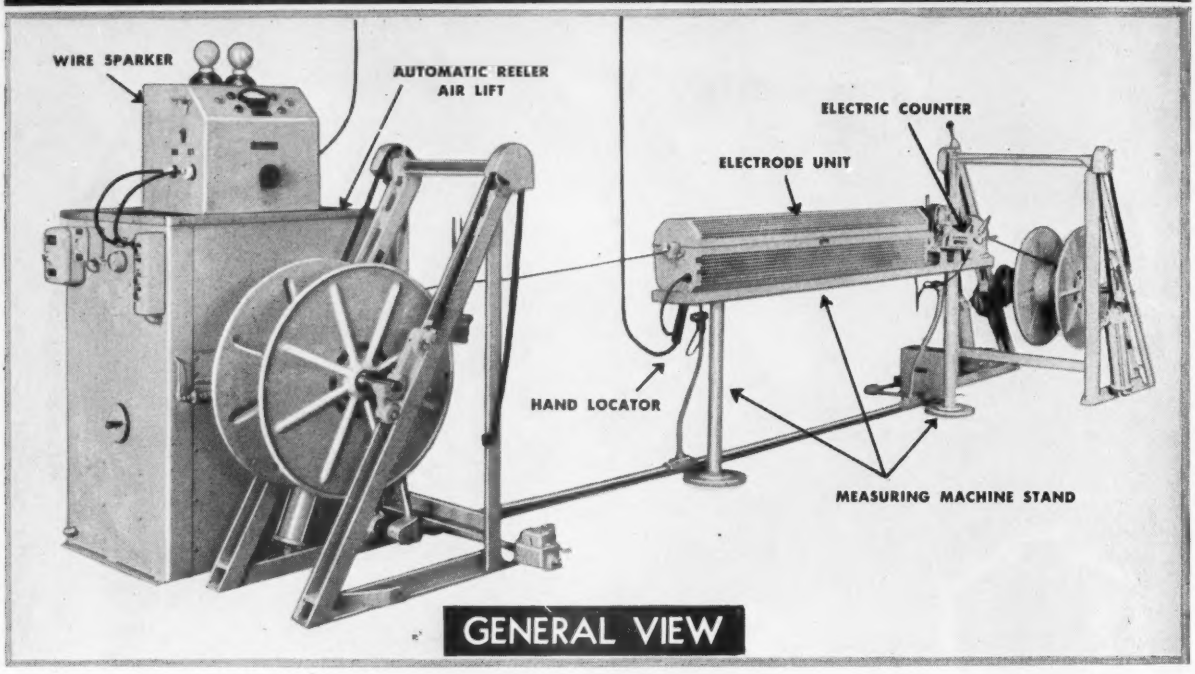
Fiberglas technicians will be glad to co-operate with you in the selection of the Fiberglas material best suited to your needs and for the development of your new products. Owens-Corning Fiberglas Corporation, Dept. 875, Toledo 1, Ohio. Branches in principal cities.

In Canada: Fiberglas Canada Ltd., Toronto, Ontario.

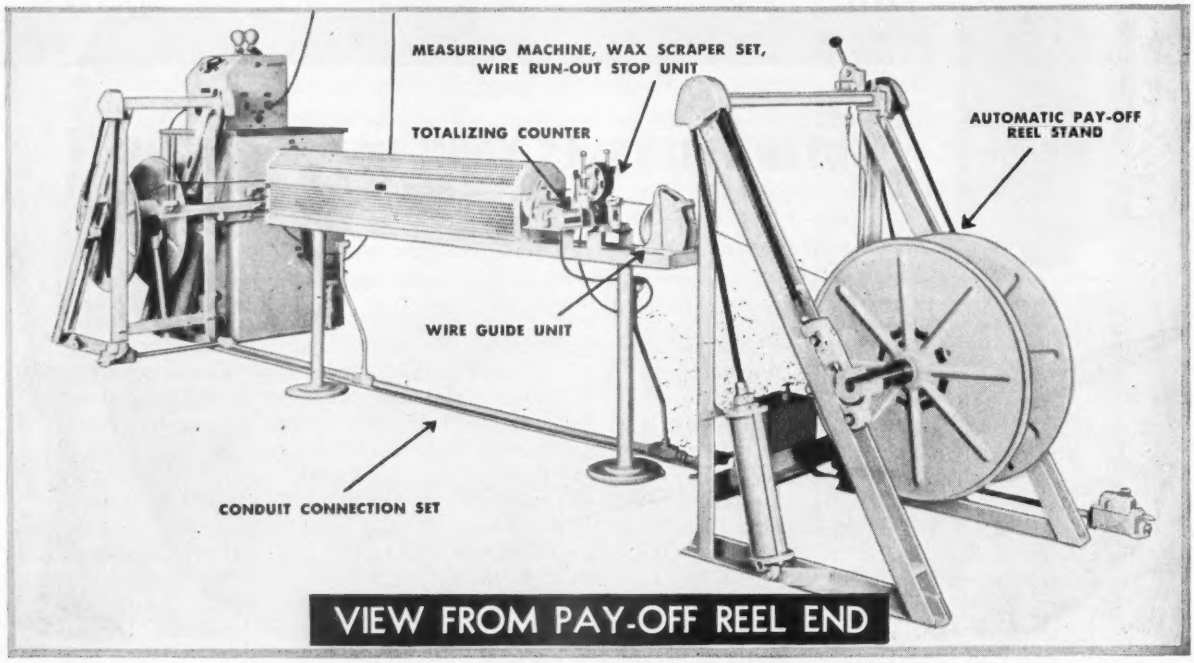
*Fiberglas is the trade mark (Reg. U. S. Pat. Off.) of a variety of products made of or with glass fibers by Owens-Corning Fiberglas Corporation.

OWENS-CORNING FIBERGLAS T.M. REG. U.S. PAT. OFF. *Yarns*

AUTOMATIC REELING, MEASURING AND SPARK TESTING EQUIPMENT



GENERAL VIEW


MEASURING MACHINE, WAX SCRAPER SET, WIRE RUN-OUT STOP UNIT
TOTALIZING COUNTER
AUTOMATIC PAY-OFF REEL STAND
WIRE GUIDE UNIT
CONDUIT CONNECTION SET

VIEW FROM PAY-OFF REEL END

Quotations on Complete Sets of this Equipment Available on Request.

JAMES L. ENTWISTLE CO.

43 CHURCH STREET, PAWTUCKET, RHODE ISLAND

World's Leading Manufacturer of Spark-Testing Equipment

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64 FRONT ST. W.
TORONTO, ONT.

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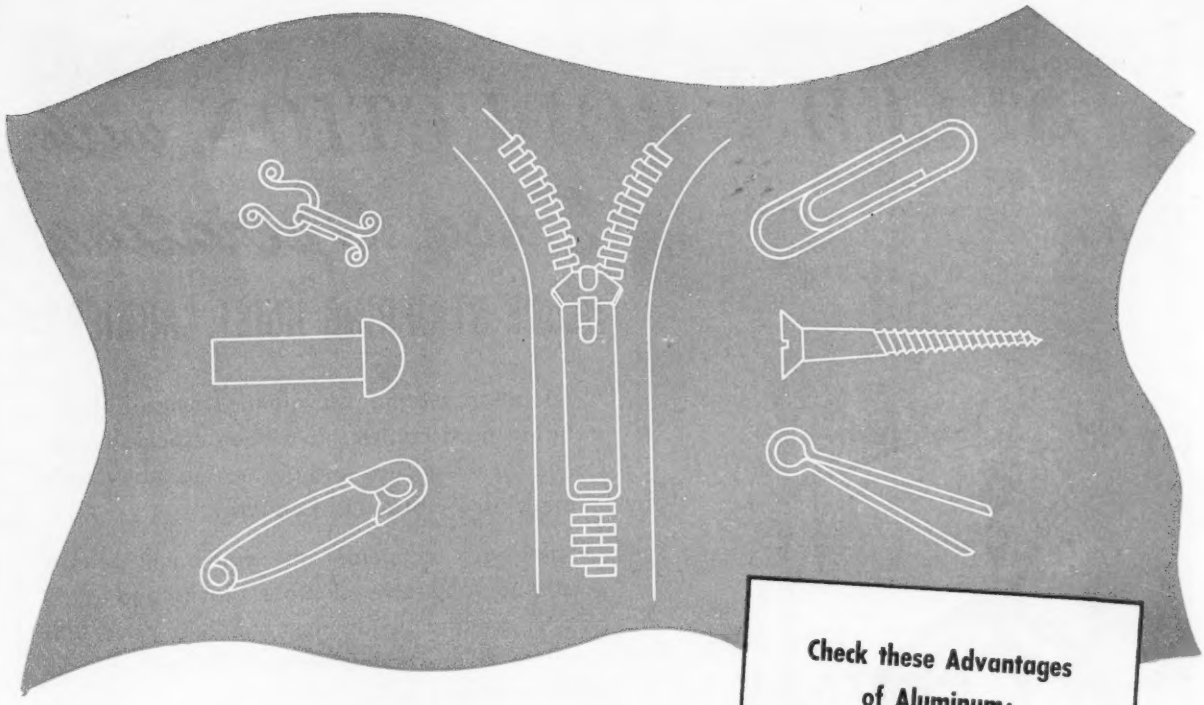
BURY ROAD, RADCLIFFE,
LANCS., ENGLAND



You can get it NOW . . .

Alcoa Aluminum Wire

for FASTENERS

The aluminum wire you need is readily available from Alcoa—in the proper sizes, shapes and alloys.

Phone your nearest Alcoa sales office. ALUMINUM COMPANY OF AMERICA, 1828 Gulf Building, Pittsburgh 19, Penna. Sales offices in leading cities.

Check these Advantages of Aluminum:

• THREE FOR ONE

One pound of aluminum produces three times as many feet of wire as a pound of brass, copper, steel, or stainless steel.

• CORROSION RESISTANCE

Aluminum does not rust or stain. Needs no protective coating.

• EASY TO WORK

Aluminum can be fabricated on your present equipment.

• ATTRACTIVE APPEARANCE

The pleasant, natural color of aluminum is desirable on many finished products. In addition, it can be economically colored in a wide variety of shades.

MORE people want MORE aluminum for MORE uses than ever

ALCOA FIRST IN ALUMINUM

IN EVERY COMMERCIAL FORM

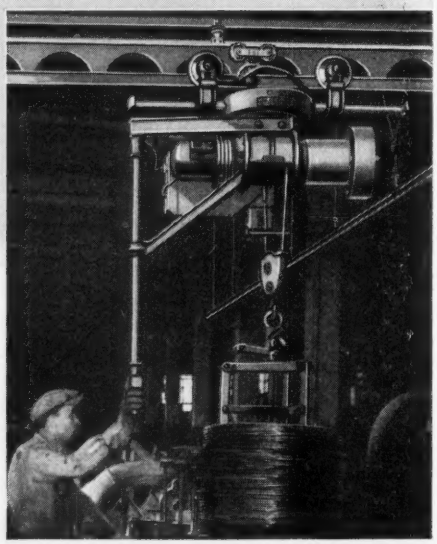
SPEED PRODUCTION *with*

Easy Operating

BLOCK-STRIPPING HOIST CARRIERS

Smooth operating Cleveland Tramrail block-stripping hoist carriers have been especially designed for this service and are serving many mills in the United States and Canada.

Safe, easy to operate, the equipment permits a man to take care of more blocks and draw heavier bundles. Older men can keep pace with younger men when Cleveland Tramrail block-stripping hoist carriers are provided.



• Electric hoist, push-button operated. Hand-propelled carrier with convenient rigid arm. Serves internal and external stripping.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

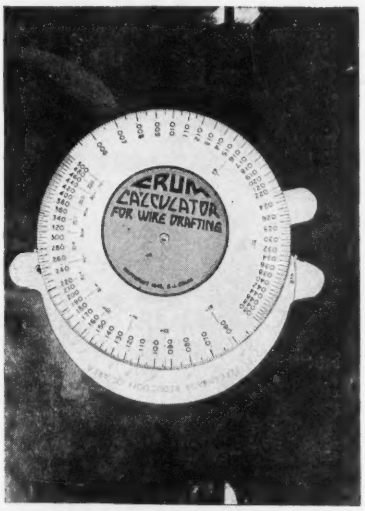
CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
9204 East, 288th Street, Wickliffe, Ohio.

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

The Crum Calculator for Wire Drafting

Provides answers simply and accurately for a given mathematical wire drafting problem. One setting shows number of holes, percentage of draft per hole, total reduction in area and intermediate die sizes to be used. Universality: Because of the circular scale there are neither upper nor lower limits on the diameters that the calculator can be used for.

* * *



Simple to operate; compact enough to carry in vest pocket; can be used for Metric as well as English systems; all diameters given in decimals. A handy and time-saving device that will eliminate time-wasting and possible errors in calculations.

* * *

The calculator can be used for drawing round copper or any other metal wire.

EXAMPLES OF PROBLEMS SOLVED QUICKLY BY USE OF THE CALCULATOR

PROBLEM No. 1

DETERMINE the reduction of area in drawing ¼-inch diameter rod to .120 inch wire.

PROBLEM No. 2

SUPPOSE that in Example 1 the tensile strength of the stock is such that the drawing process produces a tensile strength of 100,000 pounds per square inch in the .120 inch wire. To develop the same tensile strength in an .080 inch diameter wire, what stock size is required when the tensile strength of the stock is assumed to be the same as that in Example 1.

PROBLEM No. 3

IN the drafting of .0625 inch diameter wire to .025 inch, no single draft must exceed 21 per cent. Determine the minimum number of holes for this job.

* * *

THE Crum calculator is designed especially for wire drawing jobs involving eight or fewer drafts. Problems involving a greater number of drafts can be solved, however, with extra manipulation. For instance, if it is desired to set up a multi-draft machine to draw .0095 inch diameter wire from .0625 inch stock in sixteen drafts, the intermediate die sizes can be determined by the calculator.

PROBLEM No. 4

A CERTAIN five-block continuous wire drawing machine has a capacity permitting a draft of 33 per cent per hole on low carbon wire. For economic reasons it is desired to find the largest stock size that can be used when finishing .0455 inch diameter wire on this machine.

* * *

PROBLEM No. 5

A continuous machine is to be set up to draw .0375 inch tire bead wire six holes from .122 inch diameter stock. All drafts are to be equal in percentage reduction of area. Determine "a" the intermediate die diameters; "b" the per cent reduction of area per hole; "c" the total per cent reduction of area from start to finish.

PROBLEM No. 6

THE diameter of the finishing block of a double-deck wire drawing machine is twenty-four inches; the diameter of the first block, seventeen inches. The operator wishes to finish .142 inch diameter wire from No. 5 rod and therefore must determine (a) the minimum draft for the finished die, (b) the minimum first die size, (c) and the first die size when a slippage of ten per cent is allowed.

* * *

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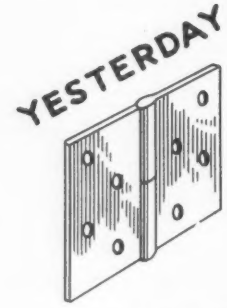

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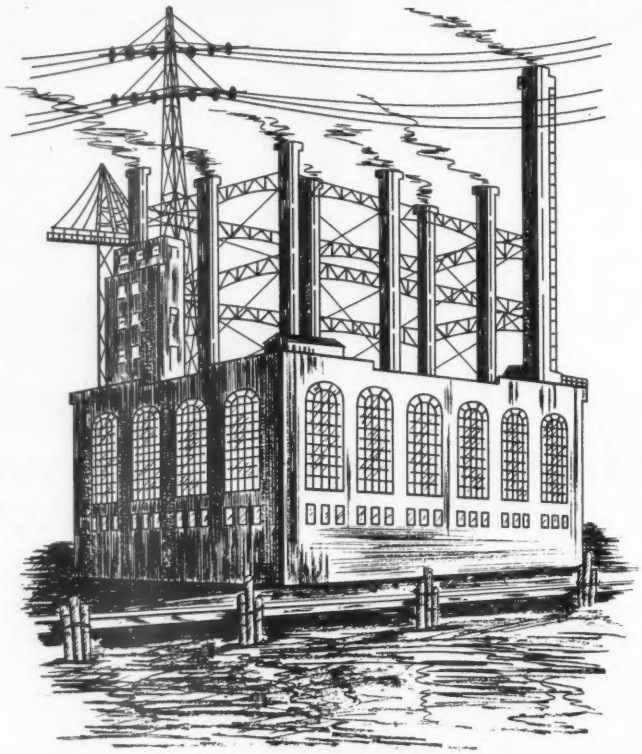

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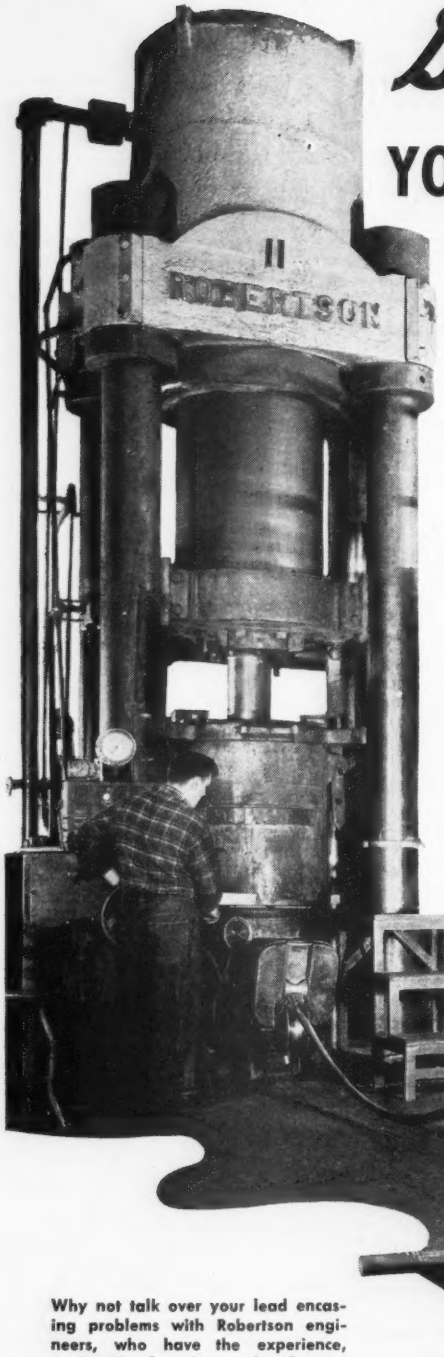

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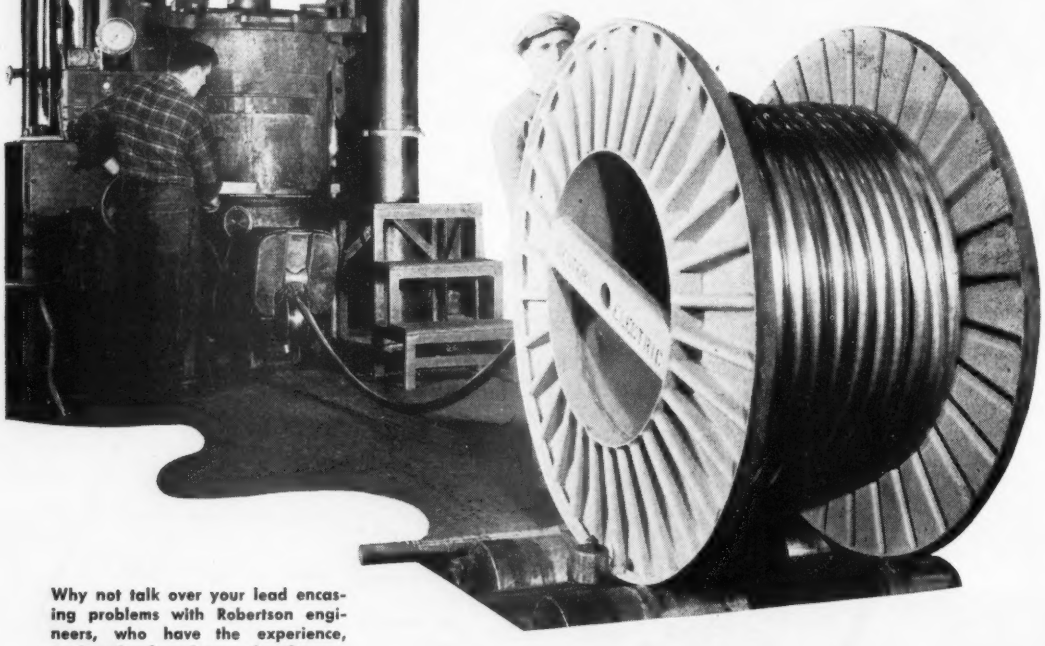

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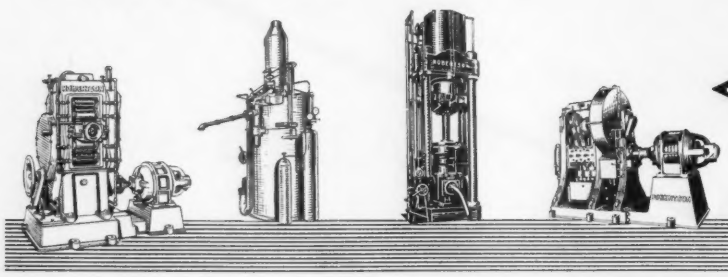

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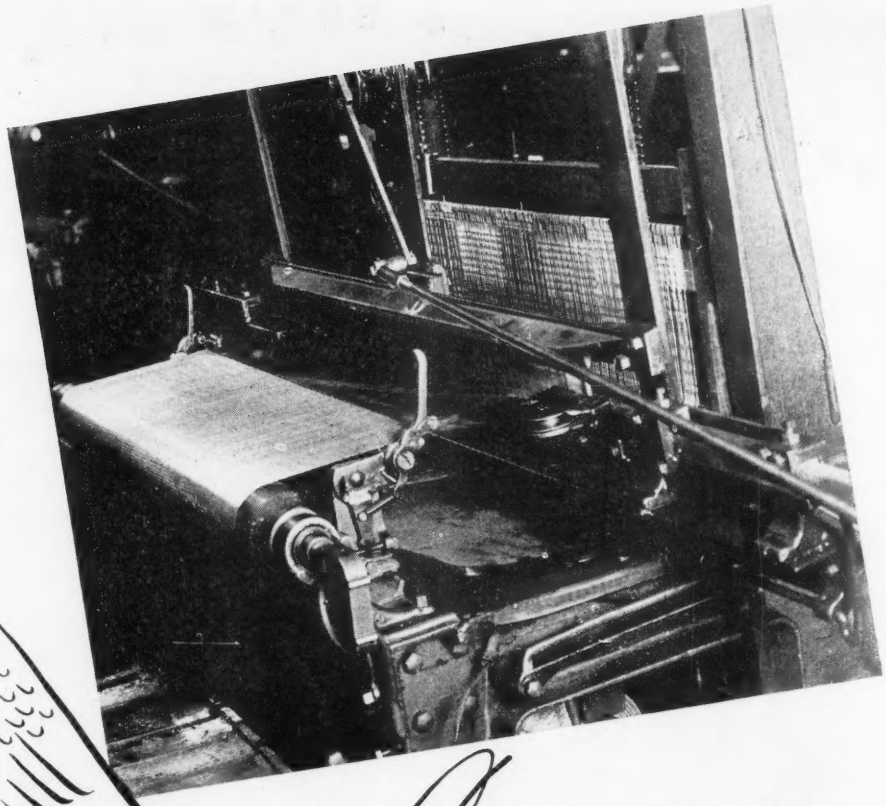

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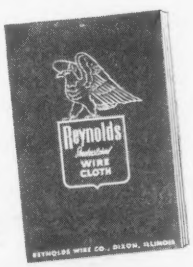

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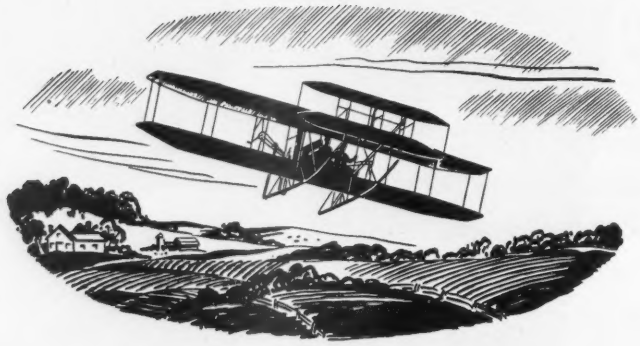

THE Wright brothers had the courage to break with tradition. The result was man's conquest of the air.

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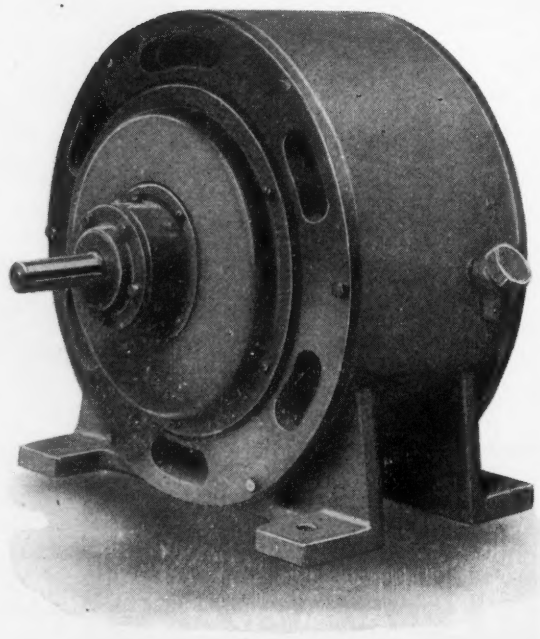

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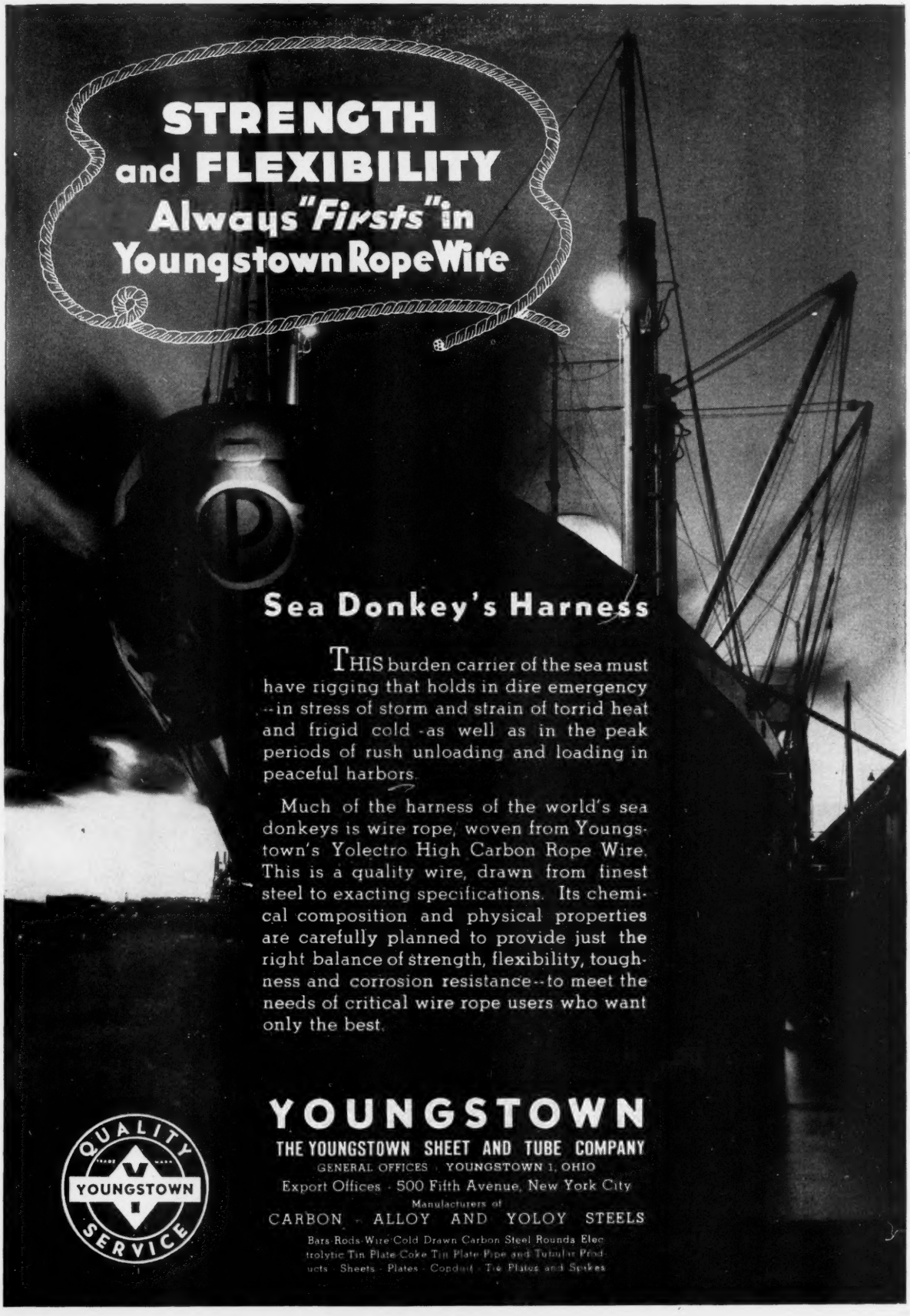
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World-wide Wire Industry Conditions
Outlook and Trend in the Wire Industry
Recent Developments in the Wire Industry

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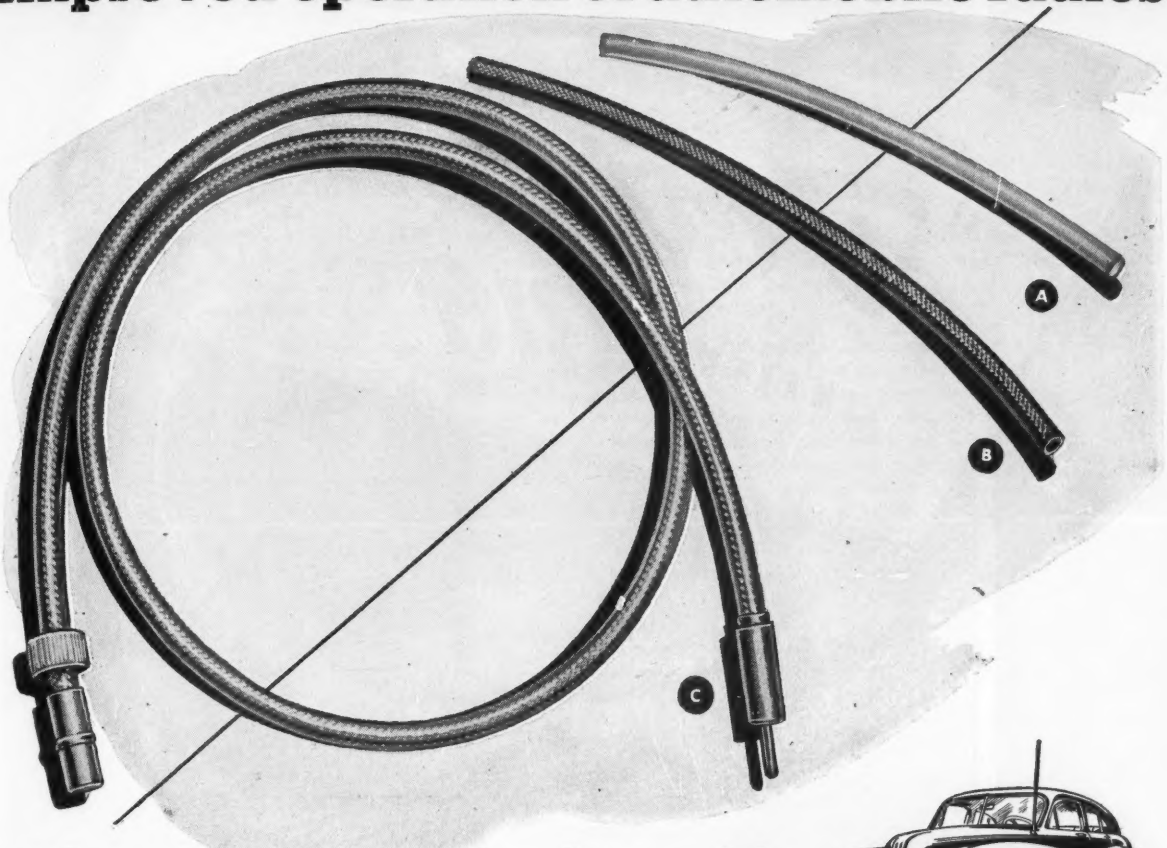
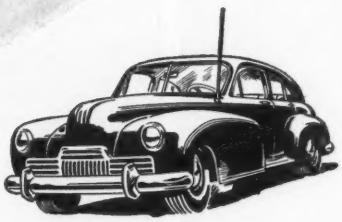


with radio antenna lead-in cable insulated with Du Pont POLYTHENE



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B *Tinned copper basket-weave braid is woven over inner core of polythene to incorporate electrical properties necessary in shielded lead-in tubing.*

C *The outer jacket, Type PM-2 polythene, about 35 mils thick, adds neat appearance, seals out water.*

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The Wire Outlook

Provided the threat of a new coal strike does not materialize, the present high levels of steel production may be expected to bring about a gradual improvement in the supply of rods and wire. Many straws in the wind indicate improving conditions right now, but the situation is still far from satisfactory.

The unbalanced steel supply is held by some to be greatly exaggerated, as the production capacity is ample for all normal requirements. To provide greater capacity would leave the steel mills with production facilities at a later date that would not justify the enormous capital expenditures to bring supply and demand quickly into adjustment. A little more time will solve the problem and leave the steel mills in a healthy state for future operations. For a while shortages and gray markets will be with us. The Federal Reserve Index shows that industrial production is running high — 190% of that for the 1935-1939 average in March and 187% in April.

Merchant and manufacturers wire products will be in tight supply for most of 1947. Some wire mills are making inroads into their high carbon backlogs, but not enough to make matters anywhere near normal. Music wire is considerably easier and new orders for most types of wire are smaller. Many wire mills, ferrous and non-ferrous, report the receipt of cancellations, but insufficient to reduce backlogs to the point of prompt service. Conservative ordering, with an eye to keeping inventories low, is the order of the day.

Rod supply for non-integrated wire mills has improved, although it may be the end of the third quarter before the supply develops some semblance of meeting the demand. Nail production, now in excess of 70,000 tons a month, will probably be curtailed, the failure of the federal housing program to materialize having resulted in an over-supply. Bale ties, baling wire, high carbon spring wire and cold heading wire for fasteners are in very active demand. Wire rope and rope wire are still running slack.

Most grades of zinc now are readily available, except Prime Western, for which production facilities are not equal to the demand for zinc for galvanizing.

Lead continues tight in the face of a plentiful supply of ores, the hitch being a shortage of labor. In the Fall this condition is expected to be ameliorated.

Aluminum continues to be plentiful, with many forms being used as a substitute for steel and copper. Some of these uses will stick, as aluminum is being found to have virtues for many applications that will justify its continued use. Six week deliveries are being made.

Probably the greatest deterrent to the "full speed ahead" signal is the cloud of doubt and uncertainty that hangs over the country as a result of political tactics in providing proper labor laws, tax revisions and spending curtailments. Most of our "servants" in government seats of power are motivated by vote-getting considerations. While labor and tax laws have been passed by Congress, at this writing there is no indication that even these emasculated measures will be made effective.

Not a single proposal in the House version of the labor bill was harmful to labor. But labor moguls, faced with some curtailment of their ability to terrorize and exploit labor, industry and the public, brought terrific pressure to bear to "soften" the laws and are still working for a veto.

America, the land of the free, will survive the political machinations of its faithless servants, but it would help tremendously to have representatives who were public-spirited, courageous and highminded.

—from the Editor's Desk

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A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 22 JULY, 1947 No. 7

Designated as
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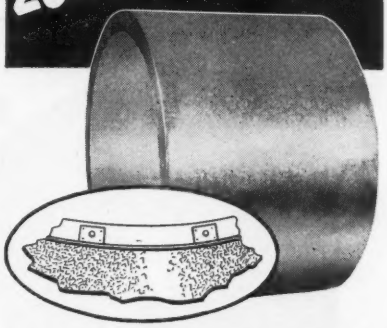

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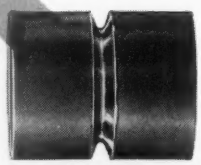

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A monthly publication devoted to the production of Wire, Rod and Strip.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 22 JULY, 1947 No. 7

Development of Steel for Bolts In Scotland

by A. P. Newall, M. I. Mech, E.

Managing Director
A. P. Newall Company, Ltd.,
Glasgow, Scotland.

In this article Mr. Newall describes the circumstances and experimentation that led, over a period of years, to the development of better steels for fasteners manufactured by them, some of which were metallurgical and others mechanical problems.

I am sure that among your readers there must be many who, like myself, have been brought up to enjoy the Waverley novels. I mention this because I remember very well before I entered my teens I read "The Fair Maid of Perth", and was so much impressed by it that to this day I remember the details of it very well. In that book there is a character who sometimes went by the name of the "Bandy-legged Smith" and at others was called "Hal o' the Wynd". He was considered at that period to be the foremost worker in steel, and had a great reputation for the making of armour. One day, while he was busy forging a coat of chain-mail, which he reckoned to be his greatest achievement, there came to see him a band of Highlanders. They had to fight a battle and wanted to get for their young chief the very best protection that could be obtained. However, as it happened, Hal o' the Wynd had his eye on the same girl as the young chief, and, as a consequence, his feelings were not friendly, and so he refused to take any price they offered, but suggested that he would gladly give them the coat of mail on the understanding that he was to be allowed to fight against them. This was an epic battle and was fought on the banks of the river Tay, and in the course of it there originated the now familiar saying, "I will fight for my own hand". This may all seem very far removed from the purposes of "Wire and Wire Products", but it really has a very close bearing on what I propose to write. My juvenile interest was much awakened by this story, and from that time I had a close interest in the working of steel. It was a long time, however, before I was able to put into effect many of the ideas which originated in what was virtually my childhood, but I am pleased to say that I have now reached nearer to the goal I set for myself.

A. P. Newall, Managing Director, A. P. Newall Company, Ltd., Glasgow, Scotland

* * *

MANY of your readers will be familiar with the fact that we sell what are called **"Newall Branded Bolts"**, and these comprise a series of developments which have taken a great many years to evolve. My first attempt was a bolt I branded **"Newall Hitensile"** and is now a type of bolt in very common use throughout the world, and the United States of America is by far

the largest producer. There can be no doubt that we in this country and in many other countries owe a great debt to the metallurgical research carried out in the United States.

* * *

IN the early days of our operations, we found great difficulty in obtaining a satisfactory type of wire, and, despite the fact that we made repeated applications to our friends in this part of the world, we just could not get what would serve our purpose, and continued for many years to buy our requirements in America. Owing to changing circumstances by the imposition of fairly high duties, we found this becoming an increasing burden, and decided to draw our own wire from American rods, and we made a very satisfactory arrangement for this purpose. I would like to put on record that the help I got from my good friends, the **American Steel and Wire Company**, proved of very great advantage to us. I am happy to say since this importation of American rods became impossible the British steelmakers have greatly improved their quality and are now producing very satisfactory material.

* * *

Fig. 2. Wire Draw Blocks * * * * *

AS I mentioned some considerable time ago, we decided to build and equip an entirely new pickling room, and I believe we have one of the best in existence anywhere. It has a number of novel features. In the building itself, there is a portal roof, and instead of windows we have utilised glass bricks, which have proved most satisfactory. The tanks, which are of the Keebush type, are set 2 feet into the floor, and we have, therefore, a clear space in which to work. The acid employed is 6% sulphuric, heated to approximately 160° F. There is a lip fume extractor on the tanks, which has proved effective. The acid is heated by submerged combustion to a temperature of about 160° F. After pickling, the rods are lifted out on a Monel metal hook and dipped into a tank filled to the brim with fresh, cold water, and from there are hosed at about 350 lb. pressure. The lime tank is made of steel; the lime is heated to 180° F., and we employ motor-driven stirrers. The type of lime used is hydrated and is in the impalpable condition. The baker is of an entierly new type recently made in this country by **Birlec, Ltd.** It is heated electrically, and opening is operated by the lowering of the rods on the hook into the baker. Baking temperature is kept to about 450° F., and baking is generally repeated four times before completion; that is to say, after the first baking the rods are moved back into the lime bath and then rebaked. This seems to provide a very satisfactory finish. The rods are then drawn on **Vaughn** and **Marshall Richards** blocks through tungsten carbide dies. That, briefly, is the story as it concerns our initial development in the bolt industry, but, coming now to the point I began with — the working of steel — I will tell as shortly as I can the story of that development.

* * *

I early realized that a medium carbon steel would never produce the kind of bolt that would be

Fig. 3. Interior View of Pickling Room * * * *

Fig. 4. Exterior View of Pickling Room * * * *

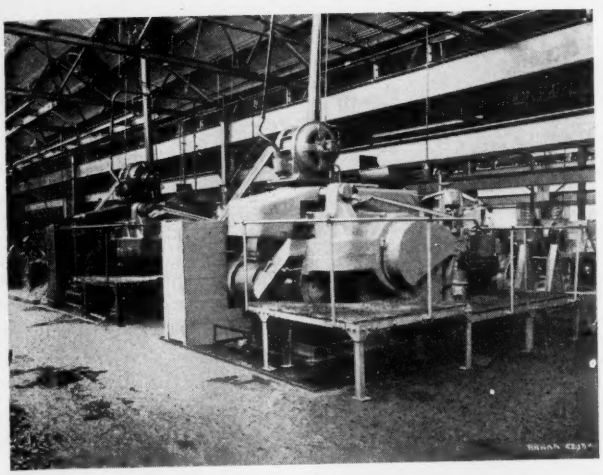

Fig. 5. Three National Boltmakers * * * * *

Fig. 6. Section of Capstan Lathes * * * * *

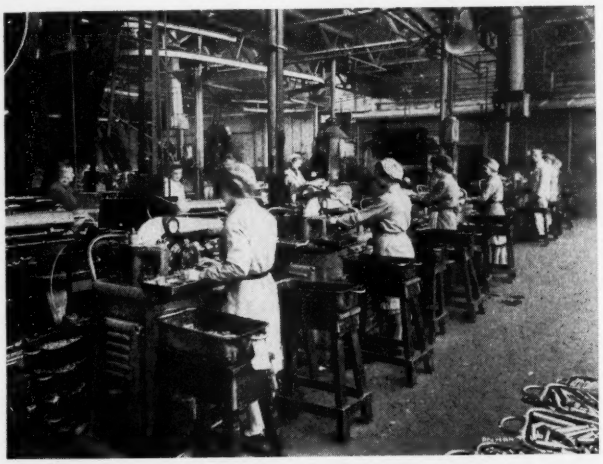

Fig. 7. Steinle Thread Generators * * * * *

Fig. 8. Thread Grinder and Section of Tool Room * * *

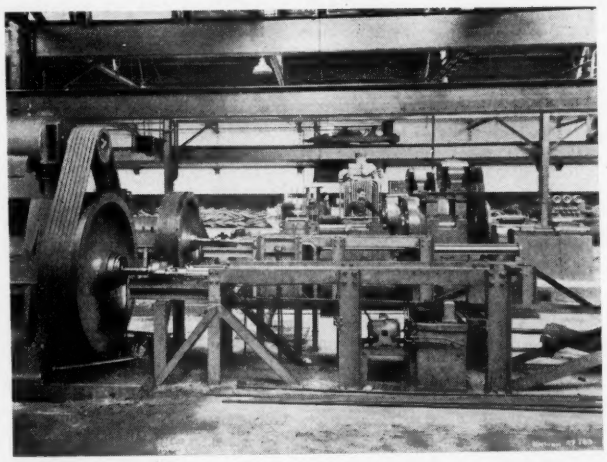

Fig. 9. Rotary Cold Swaging Machines * * * *

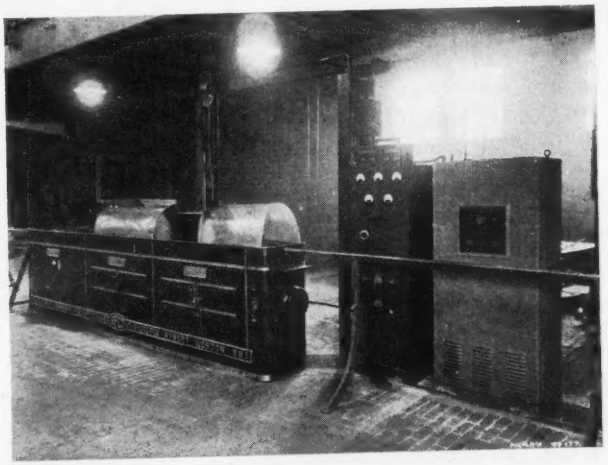

Fig. 10. High Frequency Bar Heat Treatment Unit * * *

necessary for highly stressed work, and that something better would have to be found. We had made by normal methods many nickel-chrome-moly bolts with a tensile strength of 155,000/165,000 p.s.i. When one has adopted the modern method of making bolts on the National boltmaker, the fabrication of bolts by the older methods becomes very wearisome, so that I was determined to find some way out of the difficulty of producing these same physicals by more satisfactory methods. We did succeed — thanks to the help of a good friend on your side — in finding a material which could be fabricated to get these figures, and that on the **National** boltmaker, which, in my opinion, is one of the biggest

developments in the bolt industry. Since its introduction, we branded this bolt **"Newalloy"**. The result of this development led us step by step to **"Newallastic"** studs, but I will tell that story in more detail later.

* * *

I have always had the idea that more could be done for the manipulation of steel than had hitherto been acomplished, and that, as I say, proceeded in a great measure from my absorption in the story of Hal o' the Wynd. I realized, however, that to carry out the developments I had in mind demanded a good many things which were not at that time forthcoming, so that it required a great deal of patience to wait until these things evolved. At this point, I would like to say that I do not believe that one can ever hope to get very far with anything of this nature unless it is regarded to a great extent as a hobby rather than as a business.

* * *

IT has been known for a great many years that to reduce the shank of a bolt, or stud, to well below the root diameter had a big effect on the concentration of stresses, but with the development of the type of machine which was capable of generating threads simplified matters very considerably. I had experimented a great many years ago with motorized heads, running at a high speed and using tungsten carbide tools, in order to get this type of finish, but the conclusion I reached was that success could never be looked for along these lines, and I finally discarded the whole experiment. The time came, however, when after reading a good deal of literature on this subject of concentration of stresses, I made up my mind that I must have another attempt at it, and I began to look round, to see what would be the best way to deal with the matter as a whole, and the conclusion I reached was that some method of cold swaging was the best means of obtaining my objective.

* * *

THE difficulty I came up against was that nobody seemed to agree with me on this matter and

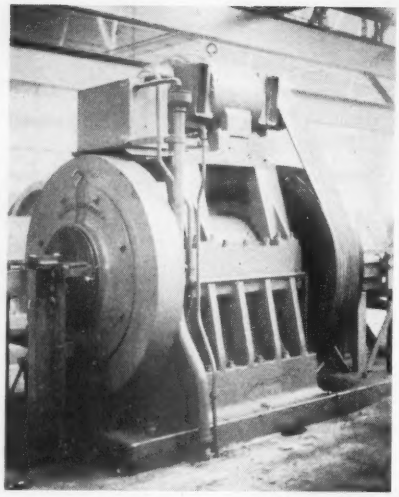

Fig. 11. View of Cold Swager * * *

asserted stoutly that anything above 135,000 p. s. i. was impossible to cold swage; this was just too low for the purpose I had in view. In connection with our other developments, we had installed cold swaging machines a good many years before, but their construction was not of a nature to enable us to go very far with our attempts at this particular experiment. I set about, therefore, finding out what could be done, and got in touch with **Stevens & Bullivant,** Birmingham, England, who had been manufacturing cold swaging machines for a good many years. They had not, however, done anything very much along the lines I had in mind, and certainly had never attempted the cold swaging of such high tensile steels. Nevertheless, we ordered some of these machines in the heaviest pattern that was then made, though, since, we have had others of very much greater weight. These are standard rotary swaging machines, but we have added a good deal of special equipment of

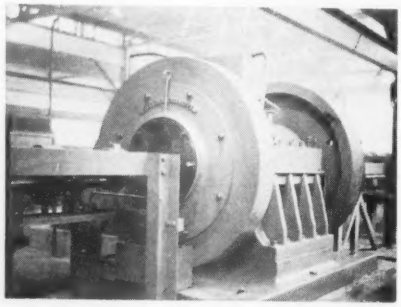

Fig. 12. View of Cold Swager * * *

our own design. After we had successfully carried out our experiments and proved that what we were attempting could be done, we went further and put in a high frequency plant for the heat treatment of bars. These bars are produced in the normal manner up to the point where we draw the rod into wire, and are drawn to a diameter equal to the pitch diameter of the thread. The coils are put on a **Hallden** straightening and cutting-off machine, and cut to suitable lengths. From there, they are removed to the high-frequency plant, where they are hardened and tempered. Your readers will appreciate that this has many advantages, especially in long lengths, as there is no difficulty in keeping them perfectly straight. These studs we call **"Newallastic"**, and with that brand they have been marketed in large quantities in this country and overseas. So far, we have had no failures reported to us, and our experience is that we maintain a greater uniformity than is possible by any other method known to us.

* * *

THIS fact then led us to consider another matter which was only introduced to us in a very casual way. I knew nothing about sucker rods, nor had I had any connection with that trade, but, for a great many years, I had done a large business with oil companies in studs made from non-creep steel, and we had also supplied the bolts for the first Iraq pipe-line. I therefore had the idea that sucker rods might be made much lighter if our methods were applied to them, and I proceeded to get a cold swaging machine capable of doing this work. It took us a long time to get this produced, but after two years it did eventually arrive, and, there again, we had to design a great many additions before it was ready to produce sucker rods. The method followed in these is very similar to that in making our **"Newallastic"** studs, but, of course, the fact that they are in 25-feet lengths does complicate matters somewhat. We had an anxious time deciding on what was the best way to attach these cold swaged rods to form a complete string, and how to get

a coupling that would "stay put" took many discussions and experiments. Finally, we decided that we would use a large size thread both ends by that method. Having done this, we screwed them into the coupling and then swaged them solid. That means that on each sucker rod there are two halves of a coupling which are joined together by a centre stud made with the regulation AP.I. thread. As we are able to produce sucker rods with a tensile strength of 160,000/170,000 p.s.i., we feel that they have certain advantages for deep wells. I would like to say quite frankly, however, that this is calculated to be somewhat more expensive than the method of manufacture adopted in America, and to that extent may prove to be non-competitive.

Fig. 13. Magnetic Crack Detection and Inspection Department

* * *

I mentioned previously that for a great many years we have made studs for the oil industry, and we have found that for a considerable number of purposes our "Newallastic" type, made from non-creep steel — and now taking the name **"Newall Hi-Tem"** — has very excellent properties. We have had very elaborate tests carried out, both at our own works and at various other places, including the National Physical Laboratory, all going to demonstrate that the fatigue resistance of a stud made by this method is a considerable improvement on the usual processes. The fact that we have been granted a number of patents, not only in Great Britain, but in the United States and Canada, would seem to demonstrate that there are many original features associated with these developments.

* * *

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The Wire Association is a non-profit organization of wire and wire products mill superintendents, executives and foremen, whose specific purpose is to improve production methods and afford a clearing house for ideas on management, technical and research problems, and to develop and maintain friendly relations among members.

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300 MAIN STREET RICHARD E. BROWN, Executive Secretary STAMFORD, CONN.

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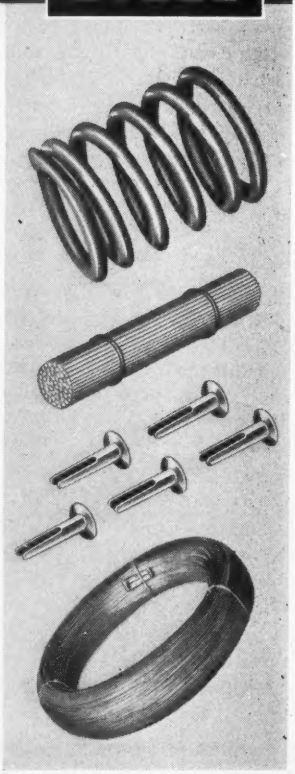

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WOOD SCREW AND MACHINE SCREW WIRE · GALVANIZED WIRE

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

EXPORT PACKING

by E. C. Barker,
Chief Field Engineer - Sales
Gerrard Steel Strapping Company
United States Steel Corporation Subsidiary
Pittsburgh, Pa.

Condensation of a talk delivered before World Trade Committee, Rochester New York Chamber of Commerce, April 3, 1947.

ONE of the first tangible results of the work of the military packaging consultants was the preparation of the Joint Army-Navy Specification 100-14A, which was the guide book for many a packaging specialist during the middle years of the war. This publication was a very good starter.

* * *

HALF-WAY through the war, Specification 100-14A was considered to be not in sufficient detail as regards various types and kinds of containers, packing materials, preservation methods, etc.; as a result of which these packaging consultants split up and amplified Specification 100-14A and came out with the individual Joint Army-Navy Specifications, familiarly known as the "JAN" specifications.

* * *

LET us now take a look-see at how our post-war American merchandise is being packed and in what condition it is being received. One overseas correspondent of a large marine insurance underwriter states: "Another problem we are faced with is the lack of proper crating and packing for the foreign trade. We go to our local customs house here and find that 99 per cent of American shipped products are improperly packed for rough-handling, sea-going and air travel. The breakage is terrific and when not properly scaled and packed, pilferage is made easy."

* * *

RIGHT now, competition is not so keen internationally, at least in certain lines of merchandise, but in the years to come when the economy of certain other nations becomes rehabilitated, competition will most assuredly become keener. This will mean that, among other things, we will have to pay more attention to our export packaging and provide our merchandise with sturdy, serviceable and at the same time, economical packages if our country hopes to retain the edge on export business it now enjoys.

* * *

IT would be extremely helpful to the packaging engineer if the management of his firm would advise him, if possible, of the type of handling at the overseas port, the port facilities such as docks, warehouses, etc., routing and method of transportation inland from the overseas port to the ultimate destination. With this information he may be able to effect certain economics if conditions are favorable. On the other hand, if overseas conditions are unfavorable, he may be able to save the entire shipment from going sour.

* * *

DURING the war years we learned a lot about packing and packaging materials. Through the combined efforts of industry and war agencies, specifications for packing materials and their application were developed so that our war supplies were arriving safely overseas. Let us apply some of that knowledge and experience now and develop a worth-while post-war packaging program. We have the standards for domestic shipment. We had them for war shipment. Why can't we develop corresponding standards and specifications, in the light of our new knowledge and experience, for present-day commercial export shipments?

* * *

WITHIN the past several months, some of the container manufacturers' associations and federal agencies have been thinking exactly along these lines. Let us hope that the thoughts and experience of these packaging specialists will soon become crystallized and that out of them will come a set of specifications in the form of a manual on present-day export packaging, as brief and, at the same time, as comprehensive as possible, easily understood, concise and to the point, and practical, allowing for reasonable economics but at the same time providing the proper margin of safety under normal conditions.

* * *

SUCH a manual should embody consideration of the principal hazards encountered in overseas shipments as follows:

* * *

1. The many times the packages must be handled, in and out of freight cars or trucks in the movement to seaboard, movement to the pier by truck, on and off the vessel, and then the reverse of this movement after the vessel reaches the overseas port.

2. The pressures exerted by other cargo in the hold of the vessel. With normal stowage in the hold of a vessel, the cargo is often tiered double "man-high."

3. The changes in atmospheric conditions causing condensation or sweat on or within the package. Exposure to rain during loading or unloading operations, or during open storage coming from present-day congestions and destruction of overseas piers and warehouses which occurred during the war.

4. The opening and recoopering of the packages by customs officials of the destination country.

5. Theft and pilferage.

* * *

WHAT container weaknesses are causing ruptured or broken packages? There are a number of

reasons but the following appear to be the principal ones:

* * *

1. Green or moist lumber, resulting in the shrinkage and warpage of the parts of the container, pulled nails and loose strapping.

2. Over-loaded containers, not sufficient attention having been paid to the strength of the container as compared to the load contained therein, and the transportation handling hazards involved.

3. Weak and poorly constructed second-hand containers, used to cut costs, often permit theft and pilferage, and without detection.

4. Lack of strapping or similar reinforcement, or improper application thereof.

5. Poor and inadequate nailing, and particularly the lack of the use of cement-coated nails.

* * *

INASMUCH as peacetime handling of goods normally is far better than that occasioned during the war, a smaller margin of safety is required to insure intact delivery. Accordingly, generally speaking, in my opinion, certain JAN requirements can be safely reduced, principal among which is the thickness of lumber, strength of fibreboard, size of straping, etc., whereas, other JAN requirements should be retained in full, principal among which are the basic designs of packages, which make for balanced construction and economy, with safety.

* * *

SPECIFICALLY, I would recommend that the sheathed crate designs be retained by peacetime exporters of large, heavy machinery and equipment. These crate designs are the result of precise engineering. Every frame member, every diagonal, riser and cross piece, is there for a good reason. The method of nailing the sheathing has its purpose. In utilizing such a crate for peace-time shipping, it is not desireable to tamper with the basic design, but it is perfectly feasible to reduce, to some degree, the lumber thickness throughout, retaining the thickness ratios of the individual members.

* * *

I would also recommend that the various types of wood box designs be retained for peacetime overseas use. The wire-bound, cleated plywood and nailed wooden boxes each have special advantages to suit varying conditions economically. The basic designs presented in wartime specifications are the result of extensive testing in the laboratory and in the field. However, here too, sizeable safety factors have been added in the form of heavy materials. Retention of the basic designs, with a reduction in thickness of materials to suit the need, should be the practice.

* * *

STRAPPING, either round wire or flat strapping, is of vital importance in export shipment. Strapping is a versatile and inexpensive method for adding strength and rigidity to a container and it is likewise of considerable value in the prevention of pilferage. I would recommend that the strapping methods and procedures outlined in the specifications be retained. However, it is believed that the gauge of round steel strapping or the width and/or thickness of flat strapping, and not the number of straps, may be reduced somewhat, with safety.

* * *

IN the reduction of the thickness of container parts, it is vital that the number spacing and placement of all nails be retained. All nails should continue to be of the cement-coated variety, except that those nails which are clinched need not be cement-coated. Nails may, of course, be reduced in size to suit the new reduced lumber thicknesses, and in the selection of the size of nails a good rule-of-thumb for this is that at least two-thirds on the nail length be contained in the part holding the point.

* * *

IN view of the prevalence of green and moist lumber as is being received these days, I would suggest that the final assembly of the container be delayed, if at all possible, until the container is nearly ready to be packed, rather than to assemble the containers as soon as the lumber or shook is received.

* * *

SIMILARLY, I would strongly recommend that the strapping of wooden containers be delayed, if possible, until ready to ship, so as to avoid the inevitable loose strapping coming from the shrinkage of the container lumber during the storage period. In this way, taut strapping en route to destination is reasonably well assured and the full benefits of efficient and effective strapping realized.

* * *

THE following rules have come to be known as "The Ten Commandments of Export Packaging":

1. Choose the proper package for the job — don't underpack and don't overpack.

2. Protect the commodity from the sweat of a ship's hold and the effects of climatic extremes from origin to destination.

3. Protect the contents from contact with water — both fresh and salt and from oil.

4. Remember that modes and methods of transportation in many parts of the world are not like those at home; your product may be handled by mule-pack, camel-pack, ox-cart, canoe, open lighter or many ways either long outmoded or even unheard of in the United States.

5. Chose a package that can be readily stacked, and that does not require preference in stowage or handling.

6. Remember that your package will receive about five times as many handlings from producer to consumer as it does in the domestic trade.

7. Protect your merchandise against that scourge of all shippers, namely "Hidden Damage", by giving as much attention to the interior packing as to the exterior; secure it within to prevent movement.

8. Protect your shipment against theft and pilferage; poor packing is as good as an engraved invitation to a thief or to a man who is hungry or ill-clothed.

9. Mark your packages correctly, clearly and concisely; avoid excessive markings as they tend to confuse.

10. Include note on every invoice to the receiver requesting a report as to the condition of your shipment on arival; this shows your customer that you are interested in his continued good-will.

TO WIRE MILL MEN

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THE WIRE ASSOCIATION

300 MAIN STREET STAMFORD, CONN.

LABOR RELATIONS

by John B. Stone
Washington, D. C.

The third in a series of articles on this subject, with particular reference to problems of the wire and wire products industry. The author is a noted authority on the subject.

TYPICAL of the general problem of labor relations confronting manufacturers in the wire and wire products field are the decisions now being worked out by leaders of trade associations in wire rope and in fine wire products.

* * *

BOILED down to its essentials the problem is this: Shall manufacturers continue to go it alone, keeping all their own secrets of labor relations and meeting their problems by themselves as they come up? Or, shall they join forces in this field and meet labor with a solid front (always within the framework of anti-trust laws) cemented by an exchange of vital information concerning the labor problems of all manufacturers in their field?

* * *

OF course in the general press and in general discussions of the labor problem, this aspect is pretty widely ignored. Many persons are placing their faith in labor legislation by Congress and expecting that the nation's laws will solve their problems for them.

* * *

BUT hard headed businessmen are more and more inclined to relegate legislation to the field of politics, convinced that any lasting stability in labor relations will have to be worked out between themselves and representatives of their workers.

* * *

FOR these men, the problem remains regardless of what political tides are sweeping Capitol Hill and the White House and they intend to meet it in their own way, on a purely business basis.

* * *

THE most profound influence working against the pooling of interests between wire manufacturers in their common labor relations problems is the traditional proud independence of manufacturers in this group.

* * *

THE business of manufacturing fine wire products, for instance, has remained a highly skilled craft where secret formulae and individual method remain of utmost importance. The craft of the workers is handed down from generation to generation and so are the secrets of management.

* * *

THE United Steel Workers of America, a broad industrial union whose workers include the lowest level of skill in the primary steel plants as well as some of the most skilled craftsmen in the fabricating plants, contributes to this feeling of reluctance on the part of some fabricators. They hope for a day when they will be facing across the bargaining table, not an industrial giant like USWA but a union of skilled craftsmen in their own field.

* * *

MOST important, these fabricators fear that a pooling of information on the labor front, might lead to a similar exchange on manufacturing techniques. They are taking no chances with their trade secrets.

* * *

PROPONENTS of the pooling plan understand this attitude but they believe it is like the proverbial ostrich which is supposed to solve its problems by burying its head in the sand.

* * *

THEY point out that the integrated plants already are taking the lead and probably setting the pattern. These plants which represent the entire width of the industry from blast furnace and rolling mill to the final finished product already have turned to the common front idea.

* * *

MEANWHILE the tide of industrial development continues to sweep towards industry-wide negotiations and these leaders believe that neither the wishes of one group of manufacturers nor legislation in Congress or the states will permanently halt this tide.

* * *

THEY point out that since labor has been organized on a national industry-wide basis it has come into possession of vital information affecting the entire industry. The steel workers since their tremendous organizing drive in the thirties have set up a strong and capable research organization which furnishes their negotiators with all vital information before they go into a bargaining session.

* * *

FOR instance a union negotiator in Hammond, Indiana, will be equipped not only with details of labor contracts in steel fabricating plants in Worcester, Mass. and Pittsburgh, but with details of wages, and "fringe" issues in plants of other manufacturers in the Hammond area.

* * *

THE only sound defense against a negotiator for labor thus equipped is the possesison of similar

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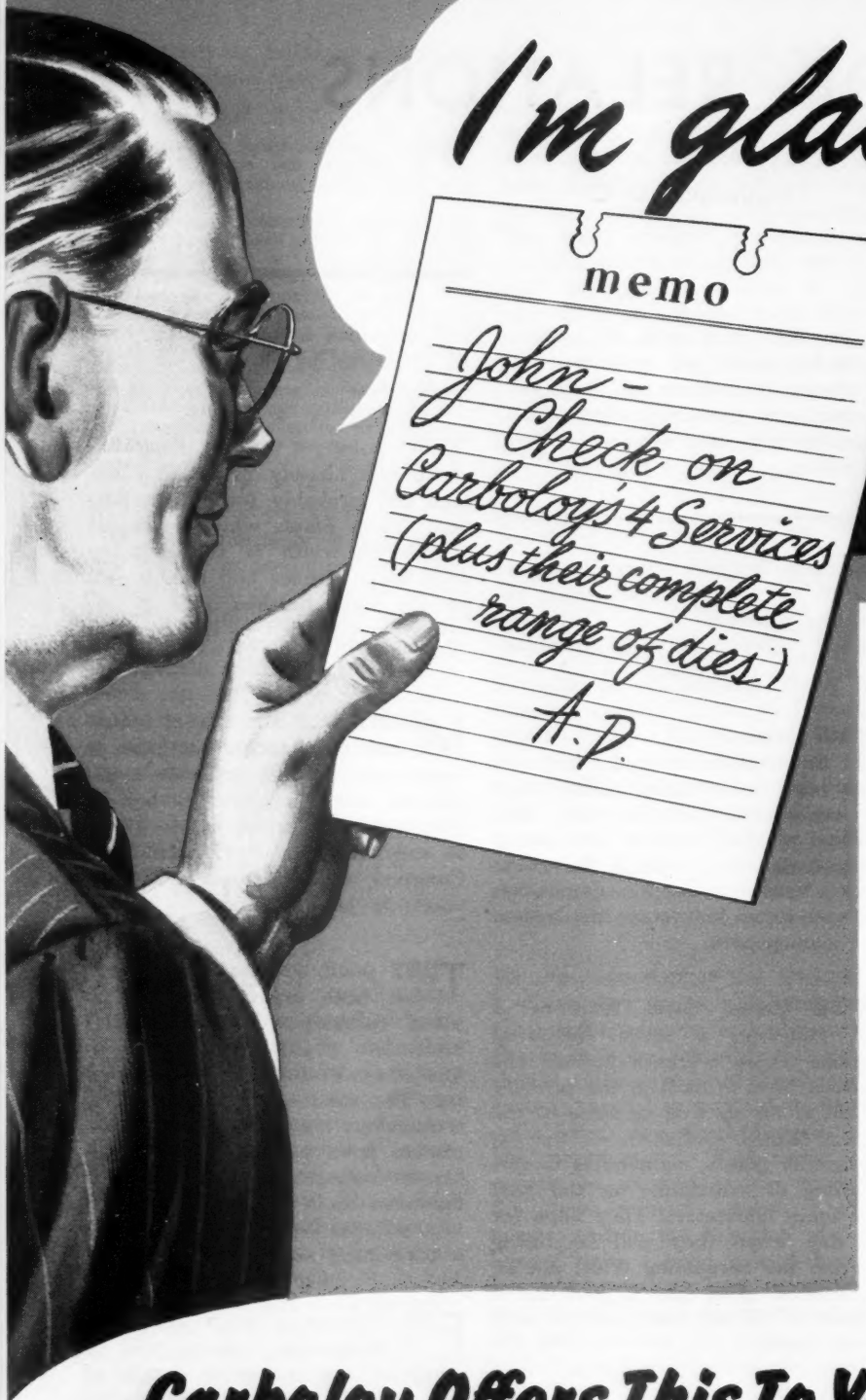

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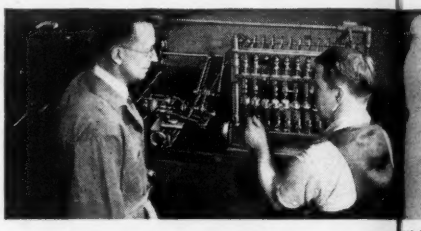

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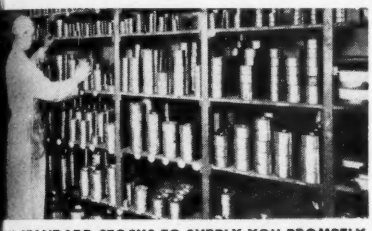

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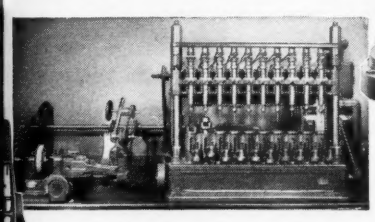

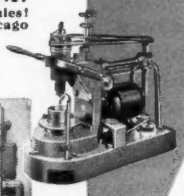

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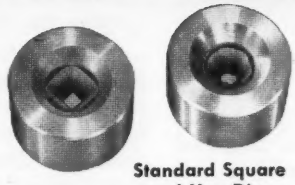

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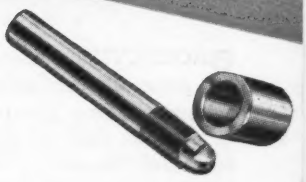

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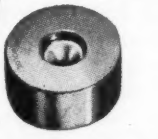
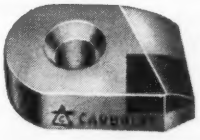
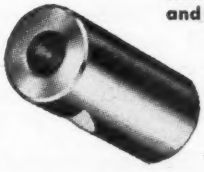


Standard Round Hole



Special Wire Forming Tool



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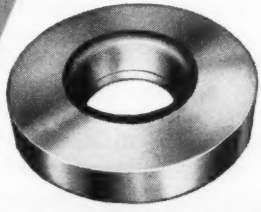

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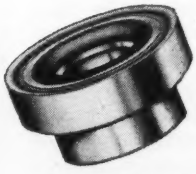
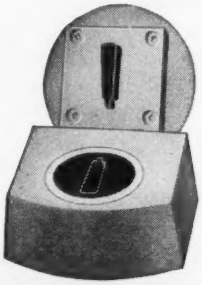
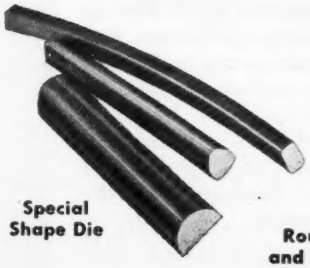


Special Round Hole Dies



Formed Dies and Punches



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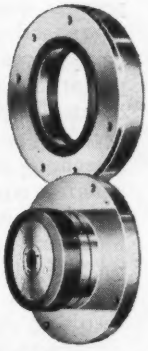

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The World Situation on Coating Materials Lead, Zinc and Tin

by C. A. Ilgenfritz,
Vice-Pres.-Purchases
United States Steel Corp. of Delaware

MAN early discovered that almost without exception, metals will corrode when exposed to air and moisture. He found, too, that some metals disintegrate faster than others. And thus began the use of slower-corroding substances to protect those that wear away faster.

* * *

PROTECTIVE coatings can be generally classified into three categories. One group is recognized as organic, such as paints, lacquers, oils and waxes; a second is inorganic, such as cement or clay; and the third is metallic. This discussion concerns three of the principal metals widely used for coating to preserve others metals. These are lead, zinc and tin.

* * *

THERE are many methods of applying lead, zinc and tin in coating other metals, the principal ones being hot dipping, electrodepositing and metal spraying. Perhaps the oldest and best known is "hot dipping." Essentially this process involves immersing the article to be coated in a bath of the molten metal. The electrolytic process was developed in recent years, and electrodeposited coatings have now assumed considerable importance, particularly in the coating of steel. Electrolytic tinning made rapid progress during World War II, increasing its scope, sufficiency, and general customer acceptance. The metal spraying method consists of atomizing molten metal by compressed air and forcing it through a nozzle at a high velocity with the resulting spray impinging on the surface to be coated.

* * *

LEAD ore occurs in various parts of the world. The principal producing countries are the United States, Canada, Mexico, Australia, Germany, and Burma. It is reported that the United States has approximately 14 per cent of the world's lead-ore reserves which, it is estimated, will last only 12 years based on the 1935-1939 annual rate of consumption.

This article, a condensation of a paper presented by Mr. Ilgenfritz before the American Iron and Steel Institute in May, is particularly timely and of interest to those of our readers who may be wondering why the supply of the subject metals has not improved. The author states the present facts, but does not attempt to forecast the future.

* * *

SUPPLIES of lead have been very precarious since the end of the war and are extremely critical now. Facing heavy reconstruction needs, Western Europe could not draw on its normal pre-war sources, Silesia and Jugoslavia, whose entire output now goes to Russia. As a result, this requirement was transferred to mines in Australia and the Western Hemisphere. This sharply affected United States lead imports, which were considerably less than in 1945, most of the tonnage coming from Mexico, Canada and Peru. Australian lead, shipped here during the war, went to Great Britain in 1946.

* * *

REFINERY capacity at the close of 1940 was 2,200,000 net tons outside and 1,068,000 net tons inside the United States. Five years later capacity here had dropped to 975,000 net tons, with Missouri alone accounting for about 24 per cent. Since 1939, there has been very little new plant construction here, while some of the foreign producing units suffered heavily during the war. This was especially true of the famous Baldwin Zinc-Lead Mine and Smelter in Burma, which had produced 75,000 tons of lead per year before the war.

* * *

ZINC ores are found in various parts of the world, principal producing countries being United States, Canada, Mexico, Australia, Germany, Italy and Newfoundland. All these, except Newfoundland, operate distillation or electrolytic zinc plants.

* * *

THE United States is credited with approximately 19 per cent of the world's zinc-ore reserves. It is estimated these reserves will last 19 years at the 1935 to 1939 annual rate of consumption. As with lead, the United States is the world's largest producer of zinc and also is the largest consumer.

* * *

RELATIVE to the foreign picture on zinc, Japan, Manchuria and Russia must be excluded because no reliable statistics on them are available. During the war, the several plants in Belgium, Holland, and Northern France were idle most of the time. Some in Belgium suffered bomb damage. One has since been dismantled because it was outmoded. Most of the zinc units in these countries escaped serious damage, but suffered greatly from lack of upkeep and deterioration while idle. There was some production most of the time, but it was very restricted by the shortage of ore and fuel, and by transportation difficulties. In the past year, conditions have improved considerably. Much progress has also been made in reviving an important electrolytic plant in Norway which survived the war undamaged. Production in Germany and Poland

(*Please turn to page* 534)

Reynolds Wire at Dixon

by Kenneth B. Lewis,
Consulting Wire Mill Engineer
Worcester, Mass.

An outline and history of the development of the Reynolds Wire Company at Dixon, Illinois. The third of a series of articles on the history of American Wire Mills.

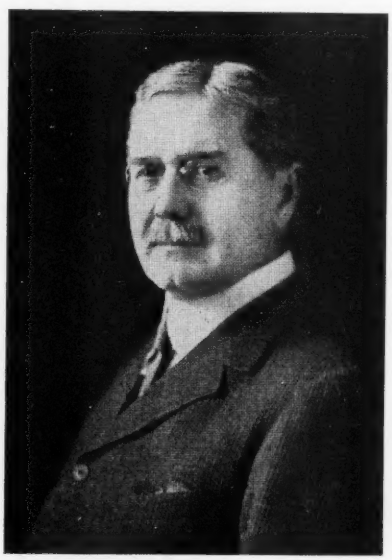
IN one respect the Reynolds Wire Company is unique; it was founded and nursed to success by a man who had never had contact with or knowledge of screen cloth, wire, steel making, or in fact any of the metal trades. His genius might just as well have expressed itself in terms of pottery, heavy chemicals, or artificial flowers, had it not been that at the time the creative urge overcame him he happened to be in a town whose chief industry was wire cloth. He himself had never so much as laid eyes on a loom.

* * *

HORACE Guilford Reynolds was born in the ancestral farmhouse at Reynolds Corners, Herkimer County, New York, in 1854. His very first commercial enterprise set a pattern of success from which he never varied. He borrowed a horse and wagon from his father, dug rhubarb roots, and set out to sell them. He carried enough home-cooked food to take him through the week, and paid for his lodgings out of his stock in trade. In a district where every family either grew its own rhubarb or didn't like the stuff, the odds against the boy were easily four to one; in fact, even money that he would never get back with the horse and wagon. The truth is that he made a steady income from the start, and his takings served later to set him up in his next venture.

* * *

HAVING absorbed all the education the district school afforded he went on to Watertown, where he rented a room for twenty five cents a day, lived on the home-cooked stuff from week-end to week-end, and continued his formal education, with special attention to mathematics and English. His command of English stood him in good stead when a few years later he found himself the proprietor, publisher, editor, and reporter of a newspaper. His thorough knowledge of and love for the English classics was known to his intimates in later years. One of his associates has told me that when moved by some unusual conjunction of circumstances, or perhaps by the unfolding of some attractive bit of landscape as they traveled, Mr. Reynolds would start reciting poetry, and go on from poem to poem till the tears would roll down his cheeks.



Horace Guilford Reynolds 1854 - 1923 * * *

I myself will testify to the soundness of his mathematics. In 1912 I tried to sell him some machinery and found that the old gentleman's pencil was sharper than mine. As I write "old gentleman" I am stabbed by the recollection that he was then six years younger than I am now. What's happened to all those years?

* * *

HAVING got all that Watertown could give him, young Reynolds went back home and taught for seven years in the local school, continuing his own education in the mean time. With what he saved out of his salary, plus the rhubarb profits, he made a down payment on a hand press in Gouverneur, N. Y., and proceeded to print and distribute the **Gouverneur Herald-Times.** In the course of time he bought a bigger press, got a better circulation, backed the Republican party with powerful pen and tongue, and in one hotly contested election which was decided by the upstate vote, he was credited with having saved the party. **Governor Platt** entertained him at Albany, and on his return his fellow townsmen staged a torch-light demonstration and parade in his honor. In fact he was so successful with the paper and its political by-product that the Democrats bought him out and extracted a promise from him that he would stay out of journalism in that part of the country.

* * *

MOVING to Cortland, Mr. Reynolds sunk the newspaper profits into the **Nelly Bly Cough-drop**, and into another popcorn confection whose name has not come down to us. This was in the

early 1890's. There will probably be others beside myself who will remember these tough times. **Cleveland** was president. The Democrats were taking advantage of their first chance to test out the theory that tariffs should be for revenue only. What was that tariff bill? The Gorman bill, was it? I wasn't voting in those days, only suffering. There was no business, and no revenue either.

* * *

I am told that the Nelly Bly Cough-drop prospered; if so, it was the only thing that did. I can't believe it. At any rate **Horace Reynolds** decided to make still another career. Attracted by the apparent affluence of the **Wickwire Brothers,** who were weaving insect screening in Cortland, he went out into the west looking for a suitable location for such a mill. He found that there was no screen cloth made west of Buffalo. He looked up and down the valleys of the Fox and the Rock rivers in northern Illinois, and finally settled on Dixon. An index to Mr. Reynolds' character can be seen in the fact that one of the first things he did in Dixon was to secure exclusive dam rights on the Rock River. Many years later when one of the big utility combinations came to Dixon looking for a good spot, they found Mr. Reynolds sitting there with five aces. Mr. Reynolds was reasonable, he was willing to listen. A contract was made, in which due consideration was given the fact that Mr. Reynolds was in a strong position. I can neither confirm nor deny the local tradition that the Reynolds meter does not register, and after all it is none of our business, but I remain firm in my conviction that Mrs. Reynolds didn't raise any half-witted children.

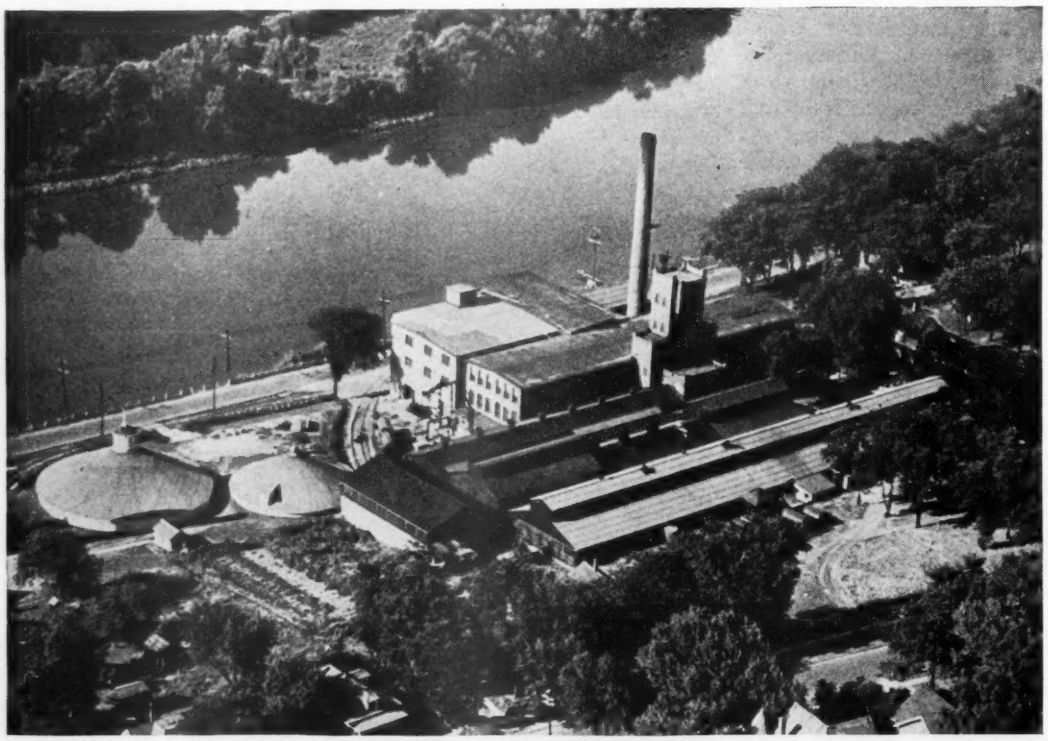
* * *

ANOTHER index to Mr. Reynolds' genius may be noted in the fact that never having seen a loom, and in the face of the fact that looms for wire were not procurable, he procured one. He set it up in an old grist mill, bought some wire, hired an operator, and started weaving screen cloth. Under the circumstances it must have been pretty awful stuff to the eye of an expert, but there was no expert there. This was a demonstration to amateurs, and the measure of its success is that stock in the projected company was promptly bought by **George H. Squires,** owner of the grist mill, and by **Dr. W. B. Merriman, Jason Ayres,** president of the First National Bank, **S. S. Dodge**, a leading merchant, attorney **E. H. Brewster, John Macken,** and **Mr. Reynolds'** brother **Elmer.** Regular manufacturing operations soon started, in the old grist mill, with a pay-roll of six.

* * *

THIS was 1894. Times were tough, but **Horace Reynolds** was tougher. Sixteen to eighteen hours a day was his steady practice, and if he came home to spend an evening he generally had his typewriter under his arm and worked on after the household was abed. 1894 to 1912 were the critical years, He worked, traveled, studied, plowed back the profits, lived with the utmost frugality, and little by little bought back the shares he had sold at the start, until he was the sole owner of the business. Just as mental exercise, try to imagine **Horace Reynolds** making a career for himself in a planned economy, or the **Reynolds Wire Co.** springing up in a totalitarian state.

* * *



Plant No. 2. The Wire Mill * * * * * * * * * * * *

IN 1915 Mr. Reynolds took the inevitable step; he put in a mill to draw his own wire. A Finn named **Lauren**, who had recently built a wire mill for **Roebling**, and still more recently had acted first as efficiency engineer and then as wire mill superintendent for the **Wright Wire Co.** at Palmer, Mass., came to Dixon for the purpose, and brought with him **Fritz Lindstrom.** Fritz is well known among wire men. He had already helped **Greening** of Hamilton to get into wire, and later did a stretch at the **Gulf States** wire mill. He is now superintendent of the **Palmer Mill** for **Wickwire-Spencer Division** of **Colorado Fuel & Iron Co.** They designed and supervised the construction of fine-wire machines of the type they had used at Palmer, and dry continuous machines for intermediate sizes of the general type known as "Dooley." For breakdown work they built a couple of rod benches of strictly orthodox design. Some of these rod blocks were later double-decked.

* * *

THE Reynolds mill has had four plant managers in the thirty one years since its wire drawing operations started. The first, and best known among wire men, was **Ralph Cohn**. Reynolds has always been somewhat apart from the travelled way in wire matters, that is, her plant managers have been men from other walks of life, who have picked up on the spot whatever wire lore they required, and her wire men have been for the most part home products, trained on the spot. Such was **Ralph Cohn**, a University of Michigan man, good executive, more or less of the research type, who made a wire man of himself in a very short time. He was a charter member of the WIRE ASSOCIATION, active in its early meetings, and very helpful indeed at a time when broadminded and helpful members were scarcer than they are today. In our early struggles to develop free discussion, Ralph was of immense value. He knew his subject well, and would always give an answer to a direct question from the chair, and when he couldn't give a frank answer he would at least give one that sounded frank, and which tended to draw out frankness from other quarters.

* * *

THE double-decking of the rod blocks was done, I understand, by **Charles Trotter,** who came to **Dixon** from **Keystone Steel & Wire Co.** and was in charge of wire for quite a few years. Four spindles were arranged to knock out five-hole 14-1/2 very efficiently, a single draft on the first, a double draft on the second at a higher speed, and double drafts on blocks three and four. All spindles delivered at proper intervals to keep the stripping and other chores on an even schedule. Stripping was mechanical.

* * *

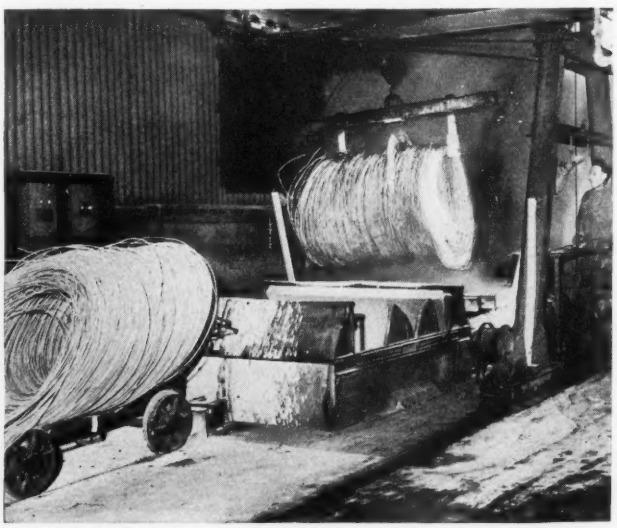
I understand that the straight-lining of the cleaning house which was done at about this time was also a **Trotter** project. The crane was a **Cleveland** gantry, the tubs rubber-lined and rubber-covered, and limed rods were shifted to steel hairpins for baking and for transportation to the rod blocks, where they were flipped off the hooks in the way which had just proved satisfactory at **Sheffield Steel Corp.** This is a very neat installation. When I was asked a few years ago to criticize it the only improvement I could make was to add a flash baker. The old rod bench I could not condemn on the score of low output per man; as a matter of fact excellent management was keeping it embarrassingly close to modern machines. We finally condemned it on the basis of high up-keep.

* * *

WHEN the Wire Association was started, the struggle to adapt basic steel to weaving wire was still a live issue, and **Ralph Cohn** was known as one of the more successful practitioners of the art. Plenty of attempts were made at technical sessions to draw out his secrets, and I will do him the justice to say that he never dodged them. He stoutly maintained that the only secret was uniformity, the result of tight control. Line up the entire series of operations so as to get a satisfactory end product, study every process, establish suitable checks, and keep every process constant. Details, he always maintained, were of little consequence, and would have to differ from plant to plant; the great thing was control.

* * *

THE initial annealing installation had been the old style coal-fired pot. Ralph installed salt baths for better uniformity. Later he redesigned the pot annealers for gas firing and pyrometers, and originated the new type of pot which hangs from the cover and is so thin-walled that it could not support anything but its own weight. Gas atmospheres were also introduced. The whole thing served to increase the posibility of uniformity in both temperature and surface condition, the latter of which factors is of considerable importance in governing the uniformity with which copper is taken up, and hence



The Cleaning Line * * * * * * *

the liability to streaky cloth. This installation was quite remarkable in its day, but it has yielded to the still greater degree of uniformity inherent in the turbulent atmosphere of the Lee Wilson bell.

* * *

ANOTHER of Ralph's achievements, if I remember rightly, was the inhibiting of the copper sulphate bath with an arsenic compound which caused it to coat the immersed wire with a definite amount of copper, regardless of the time of immersion.

* * *

RALPH Cohn was followed by **Lloyd Dunkelberger,** who, like Ralph, was a wire man only by adoption, but who became well known in wire circles. After he left Dixon he was lost to sight for a couple of years. I had a few cards and notes from him which told me nothing, though the postmark "Hanford, Wash." later came to be associated in all minds with neuclear fission and the "Manhattan Project." After his country dismissed him, Lloyd fell into something pretty sweet, nothing less than the superintendency of **Mars Incorporated,** (give that lady nine silver dollars), where he was welcomed by a former associate, **Lloyd H. McClendon,** once chief chemist for Reynolds, an ex-member of the Wire Association, who, by the way, is credited with the development of the non-softening chocolate coat for candy bars which kept these confections from going Democratic on far-flung Pacific atolls.

* * *

FOLLOWING **Dunkelberger, Bill Bawden** carried on for a couple of years, the only actual wire man to have acted as plant manager. He was a Republic man, Chicago District, and after his tour of duty at Dixon became superintendent at **Gilbert & Bennett's** at Georgetown, Conn. He was succeeded by **Ervin Brinkman,** another wire man by adoption only, and he in turn has been succeeded, in a sense, by a genuine wire man by birth and training, **Bill Haarbauer,** who was trained by his father at **Townsend's** in New Brighton. I say "in a sense" because I understand there has been a shuffling of the organization chart that splits the responsibilities a little differently and gives Bill more direct charge of wire than of the end product.

* * *

REYNOLDS men, as a rule, have been locally developed and have stuck close to Dixon,. consequently have not been too well known in wire circles, but there are exceptions. **Dick Weyant,** who worked up to superintendency of the wire mill, shifted to **Wilson Steel & Wire,** and now has his own wire mill in Chicago. The **Rinehart** boys are well worth a paragraph, **Delbert,** who recently carried on as wire mill superintendent during an extended vacancy, but who has now been shifted back at his request to the weaving side, and **Revere,** familiarly known as "Rainbow", than whom there is no keener judge of woven mesh in my experience. After twenty years with Reynolds, **Louis G. MacDonald,** "Mac" to the trade, recently retired from active work as vice president, though he remains available as consultant. He was previously with **American Wire Fabrics,** and with their successor **Wickwire-Spencer.**

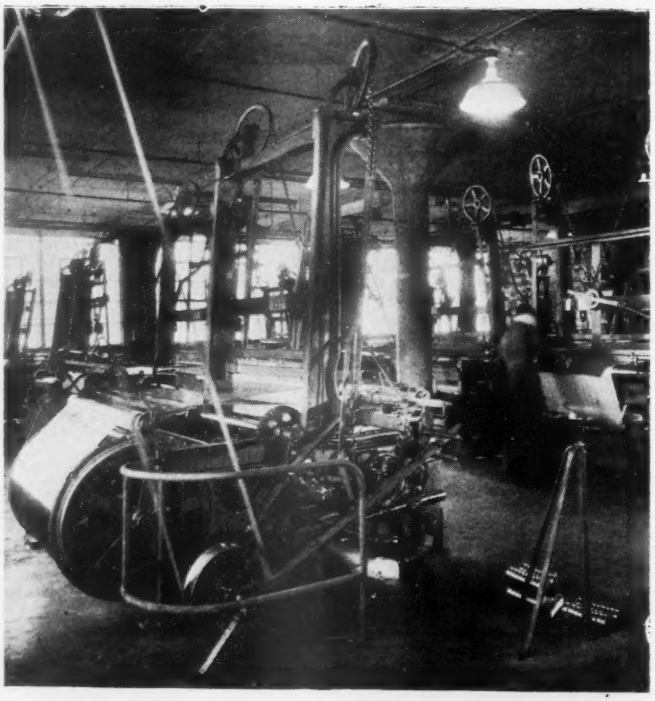
* * *

HORACE Reynolds died in 1923, leaving the impress of his personality not merely on his plant but on the industry. He was quality minded, and proud of his product, and saw no reason why he should be silent about it. He was the first to see his screen cloth as an individualized product of high grade, and worthy of consideration as such rather than as so many yards of an un-named staple. His **"Red-Edge"** was the first branded product of its class, and he introduced the practice of marking off the rolls into feet and half-feet to facilitate retailing.

* * *

MR. Reynolds left no sons, but his daughters, **Pauline** and **Lucile,** brought into the business as husbands two men who could scarcely have been better chosen to carry forward the quality tradition. **Douglas Harvey,** who served as president from 1923 to his death in 1930, was a good engineer, and I am perfectly certain that some of the advances in practice which I, in my ignorance, have attributed to the various managers of the moment, were either initiated by **Douglas Harvey** or were nursed by him to success under something more than perfunctory super-

(Please turn to page 534)



A Screen Cloth Loom * * * * * *

GOVERNMENT WIRE PRODUCTION INFORMATION

Report Available on German Steel Wire

ELECTRO-GALVANIZING of heat-treated steel wires for use in making wire rope which was tried for several years in a specially designed German plant proved uneconomical and gave less satisfactory results than other methods according to a British report now on sale by the Office of Technical Services, Department of Commerce.

* * *

THIS report on German wire drawing and steel rope manufacture was written for the British Intelligence Objective Sub-Committee by J. C. Richards, member of an Australian scientific and technical mission. Mr. Richards visited three leading wire and wire rope manufacturers as well as the most important mine rope testing station in Germany.

* * *

THE firm of Felton and Guilleaume, Koln-Mulheim, one of the largest German wire rope producers, set up in 1939 what is believed to be the only electrogalvanizing plant in that country. The equipment was capable of handling 30 strands of 0.2- to 0.9- millimeter wire. Degreasing and pickling were also done electrolytically. The report includes a translation of a German technical paper describing the process.

* * *

THE Germans found electro-galvanizing considerably more expensive than hot dipping. Hot dipped wires were also said to have greater resistance to corrosion because of the formation of an iron-zinc alloy layer which is not formed in the electrogalvanizing process.

* * *

AT the "Seilprufstelle," the government-operated mine safety control center in Bochum, Mr. Richards studied the methods and equipment used to test wire rope. He noted especially an electromagnetic device used to locate either external or internal broken wires. The unit had two field coils and a probing coil connected to a galvanometer. When a steel rope was run slowly through the electrified field coils the galvanometer's reaction was recorded on a continuous film. One broken wire in a rope was enough to cause a major deflection of the galvanometer. The device was used only when visual inspection left doubt as to the condition of a rope.

* * *

THE report (PB-49242; **Steel Wire: Notes on German Wire Drawing and Steel Rope Manufacture;** photostat, $3; microfilm, $1; 40 pages; dated 1946) includes production and testing data and photographs of equipment.

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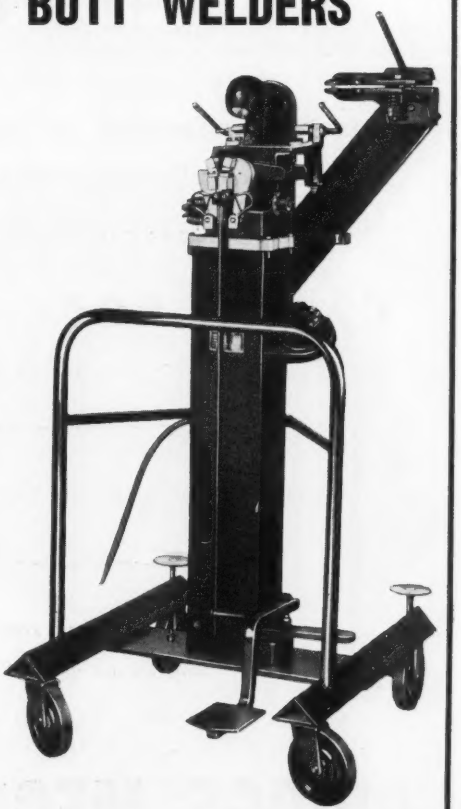

These welders are used for welding COPPER, ALUMINUM, and other non-ferrous wire ranging in size from .031" to .128" diameter.

The welding cycle on these welders is automatically controlled and completed by a single downward stroke of the foot pedal, which include the clamping of the wire being welded, contacting the welding switch, and applying the upset pressure on the weld. All units are equipped with annealing dies, filing vise, light, extension cord, and mounted on a 4-wheel truck.

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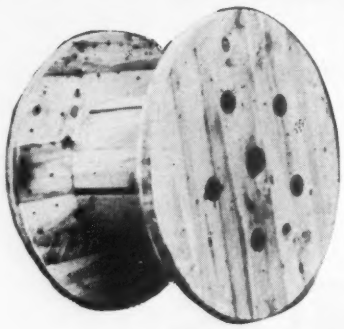


OF WOOD

RETURNABLE and NON-RETURNABLE

Furnished assembled or knocked down, made to your specifications. Will withstand severest handling. Sturdy, strong, low in cost. Made for

CABLE, ROPE and WIRE

in any size from 12″ to 96″ in diameter.

ALSO, REEL HEADS FOR STEEL DRUMS

Send us your specifications and let us quote on costs.

BRIDGE MFG. CO., Inc.

HAZARDVILLE • CONNECTICUT

ORDERS for the report should be addressed to the Office of Technical Services, Department of Commerce, Washington 25, D. C., and should be accompanied by check or money order, payable to the Treasurer of the United States.

* * *

Government Reports

WARTIME scarcity of nonferrous metals forced the Germans to develop unusual hydrometallurgical techniques and resulted in new methods of saving materials according to one of two reports on nonferrous metals now on sale by the Office of Technical Services, Department of Commerce.

* * *

THE report on nonferrous metal production processes in the Hamburg district of Germany was prepared for OTS' technical industrial intelligence division by William C. Aitkenhead. The report describes processes and equipment observed at two pyrite cinder leaching plants and at two smelters which produce nonferrous metals and such byproducts as crystallized salts and pigments.

* * *

THE leaching plants were designed to prepare sintered iron oxide suitable for blast furnace feed, using pyrite cinder from sulfuric acid plants. The report describes the German method of treating pyrite and the process for recovering copper, zinc, silver, gold, cobalt, lead and Glauber salt.

* * *

ONE plant uses an unusual aeration tank for iron precipitation which may have value here in connection with zinc hydrometallurgy and cyanidation, according to Mr. Aitkenhead. Iron in the leaching solution is dissolved in the ferrous state by cementation of copper. The iron must then be oxidized to the trivalent state for satisfactory precipitation. Oxidation and precipitation are carried out in the aeration tank, a sketch of which is included in the report. The aeration tank method of oxidation is claimed to be very efficient and superior to the procedure of blowing air through the solution.

THE German copper, lead, zinc and tin smelting and refining industries resemble those of the United States in their close interdependence, the second report states Lead fumes and slags from copper smelters and refineries are shipped to lead smelters which, in turn, ship zinc fumes and slag byproducts to zinc smelters. Copper scrap plants send mixed lead-zinc-tin oxides to either zinc or tin plants and the tin plants supply zinc-oxide fumes to the zinc smelters. Zinc plants ship copper residues and lead byproducts to copper and lead smelters.

* * *

THE reports are: PB-44959 **(Nonferrous Metal Production Processes in the Hamburg District:** photostat, $2; microfilm $1; 28 pages, including simplified flow steets of pyrite, bress, bronze and speiss treatment, drawings of equipment and tables of production data, dated June 1946).

PB-1275 **(Copper, Lead, Zinc, Tin and Antimony Smelting and Refining in Northwestern Germany;** photostat, $4; microfilm, 50 cents; 50 pages; dated 1945).

* * *

ORDERS for these reports should be addressed to the Office of Technical Services, Department of Commerce, Washington 25, D. C., and should be accompanied by check or money order, payable to the Treasurer of the United States.

War Assets Administration

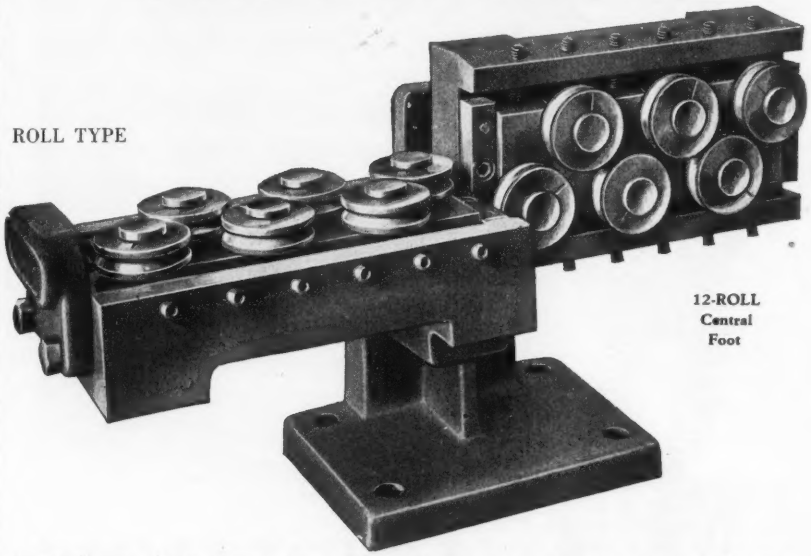
ROBERT W. Wolcott, Coatesville, Pa., President of the **Lukens Steel Company,** and Chairman of a newly formed Steel Foundry and Scrap Industries Committee, has appointed local committees to cooperate with each of the 32 Regional Offices of War Assets Administration.

* * *

THESE committees have been organized to help expedite the disposal of iron and steel scrap. Mr. Wolcott is Chairman of the Scrap Committee of the American Iron and Steel Institute. During the war he served as advisor to the War Production Board.

TWO WIRE STRAIGHTENERS
WITHOUT CUTTING ATTACHMENTS

ROLL TYPE



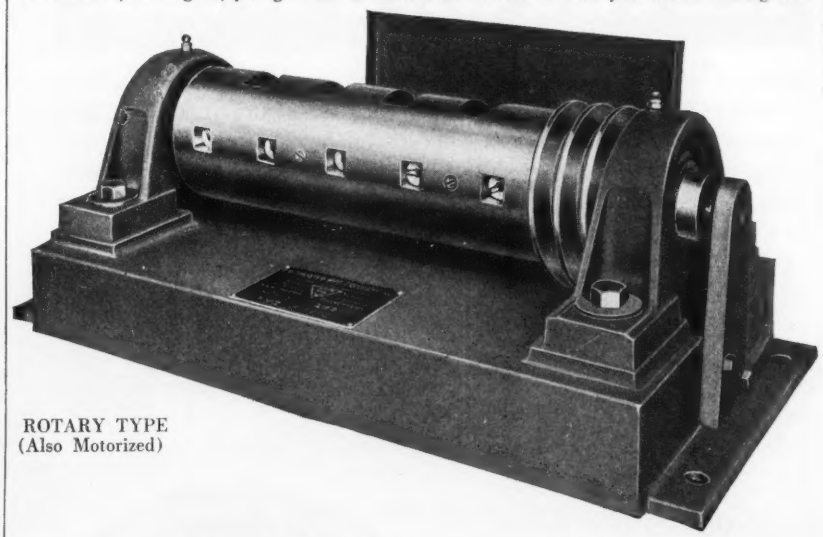
12-ROLL Central Foot

The Roll Type design shown above is generally used with automatic machines. The wire is drawn through the straightener to remove the natural curve and put it into better shape for the forming dies. Made in sizes from 1/16″ to 1/2″.

The Rotary machine shown below has no feeding attachment. The wire is pulled through mechanically while the head revolves at high speed. Made in sizes from 1/16″ to 3/8″.

In the case of either of these machines the size indicates the maximum diameter of wire that can be handled, but several smaller sizes can also be worked.

Glad to send further information. It will help us in recommending a suitable material for the dies if, writing us, you give the diameters and kinds of wire you wish to straighten.

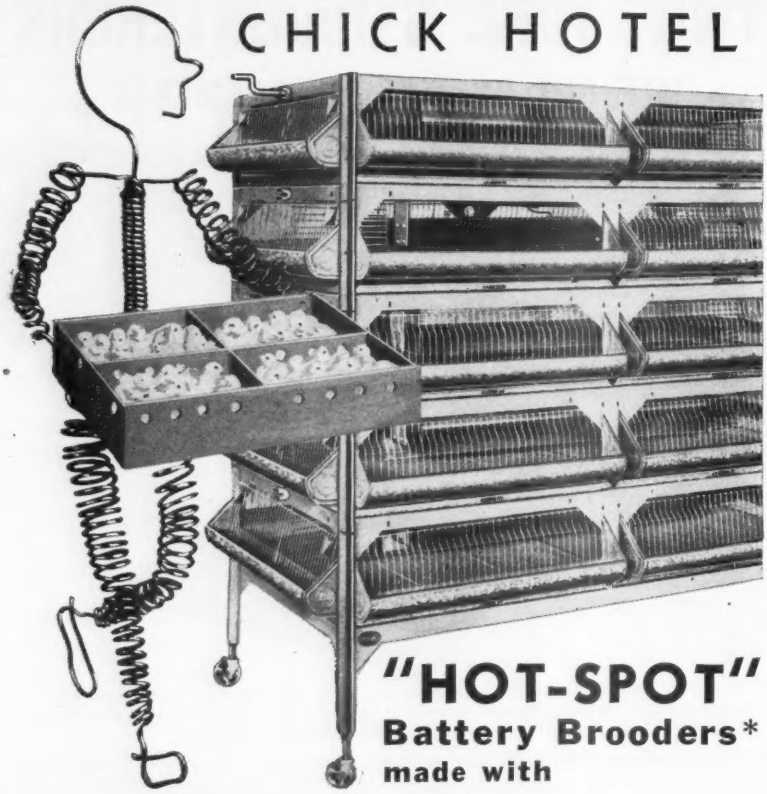


ROTARY TYPE
(Also Motorized)

THE F. B. SHUSTER MFG. CO., INC., NEW HAVEN, CONN.
3102 MILL RIVER ST.

SHUSTER SINCE 1866

Automatic WIRE STRAIGHTENING AND CUTTING MACHINES



"HOT-SPOT"
Battery Brooders*
made with

KEYSTONE WIRE

Here's a five-story chick "hotel" with automatic heat on every floor . . . keeps the chicks comfortable even when the room temperature goes down to 40° or lower. Wire side grills permit the chicks to reach through to the feeders and waterers. These troughs can be filled from the outside, saving hours of time and work. Chicks are raised on wire-mesh floor — an important sanitation feature.

As you can see, wire plays an important part in the construction of "Hot Spot" brooders. It is essential that the wire have good spot-welding characteristics, be well galvanized to resist rust, and bright and shiny for sales appeal. Silver-bright Keystone wire provides these qualities, just as other special Keystone wires meet manufacturers' exacting needs.

Whatever your wire requirements, Keystone can normally supply them.

*Klein Manufacturing Co.
Burlington, Iowa

KEYSTONE
MUSIC SPRING WIRE
KEYSTONE STEEL & WIRE CO.
PEORIA, ILLINOIS

SPECIAL ANALYSIS WIRE
for all industrial purposes

KEYSTONE STEEL & WIRE COMPANY
PEORIA 7, ILLINOIS

ROBERT M. Littlejohn, WAA Administrator, today directed all Zone and Regional Directors to cooperate with the Wolcott Committees. Mr. Littlejohn's program is to sell as quickly as possible all iron and steel scrap in the possession of WAA.

* * *

THE Administrator has directed all officials of WAA to report at once any existing procedures, rules or regulations that handicap prompt disposal of scrap.

Two Recent Booklets Provide Helpful Data on Coolants and Rust Preventives

IN a recent announcement sent to metal working plants across the country, **Oakite Products, Inc.**, New York, offered free copies of two illustrated booklets providing many specific production suggestions for improved machining, cutting, grinding and related operations on ferrous and non-ferrous metals and for preventing formation of rust on ferrous surfaces between machining operations.

* * *

THE first of these booklets discusses fully the applications of Oakite Soluble Oil and Oakite addition agents for meeting unusual or special machining problems on a wide range of work, gives starting point formulas for making up Oakite coolant emulsions for operations on steel, brass, aluminum, plastics, etc. A special section is devoted to helpful tips concerning correct mixing procedures for coolants to avoid inverted emulsions. Second booklet provides valuable data on temporary or semipermanent rust protection of ferrous parts or work with Oakite Special Protective Oil, following such operations as grinding, machining, pickling, tumbling, sand blasting, brazing, etc.

* * *

INDUSTRY personnel and readers of this publication desiring free copies of these two booklets may also obtain them by addressing Oakite Products, Inc., 152A Thames St., New York 6, N. Y.

Outstanding Personalities of the Wire Industry

Lindgren and Dimling Join Metal Carbides Corporation

METAL Carbides Corporation, Youngstown, Ohio, announces the appointment of two new Sales Engineers. **R. M. Lindgren,** former Chief Engineer of Lincoln Park Industries, and **Paul E. Dimling,** formerly with the Firth-Sterling Steel and Carbide Co., have their headquarters at 6432 Cass Avenue, Detroit 2, Michigan. They will cover the state of Michigan and the Detroit industrial area, selling servicing, and giving recommendations on the use and application of Talide grades of sintered carbides and hot pressed carbides.

* * *

Ross Engineers Hold Sales Conference

MORE than 100 of the sales engineers from all United States and Canadian offices and plants of the **J. O. Ross Engineering Corporation** were present for the firm's Annual Sales Conference held in New York. The week of April 14-19 was given over to daily sessions at which sales and engineering developments were thoroughly discussed. Many of the new air systems being planned for improved processing operations in major industries, were explained in detail.

* * *

THE sessions were conducted by **S. W. Fletcher,** President, who referred to the expansion of the firm's activities and the diversification of manufacturing processes in which Ross Air Systems are now being used. Staff members attended from the firm's offices in New York, Boston, Chicago, Detroit, Los Angeles and Montreal, as well as from the plants maintained at New Brunswick, N. J. and Verdun, Canada.

MR. **J. O. Ross,** Chairman of the Board, who had just returned from a trip to Mexico, outlined developments in foreign markets in his reference to the activities of the firm's English affiliate, Carrier-Ross Engineering Company, Ltd. of London.

* * *

Macwhyte Elects Officers and Directors

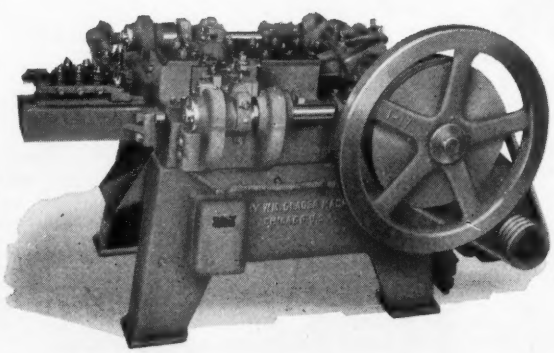
AT the Annual Meeting of Stockholders of Macwhyte Company, wire rope manufacturers at Kenosha, Wisconsin, the following directors were re-elected to serve until the next annual meeting:

Jessel S. Whyte, H. E. Sawyer, R. B. Whyte, R. P. Tyler, R. P. Cavanagh, J. T. Wilson and W. Robert Johnston.

* * *

FOLLOWING this meeting, the directors elected **Robert P. Tyler** Vice-President in Charge of Sales. He was formerly General Sales Manager.

GLADER HIGH SPEED WIRE NAIL MACHINE



MACHINE ARRANGED FOR INDIVIDUAL MOTOR DRIVE

High tonnage output, and low maintenance costs, have resulted in Glader Machines being accepted as standard equipment in every large nail mill built in the United States in the past twenty years.

Glader Machines are operating in most of the wire producing mills throughout the world.

These machines are made in eleven different types and sizes. This enables us to cover the range of sizes of nails produced with the greatest efficiency.

For further information please address,

WM. GLADER MACHINE WORKS

210 No. Racine Ave.
Chicago 7, Illinois

Export Dept.: 122 E. 42nd Street, New York 17, N. Y.

Coe Moved to Decatur Works by G.E.

APPOINTMENT of **Clarence W. Coe** as manager of the new Decatur, Ill. Works of the **General Electric Plastics Division**, has been announced by **George P. Lehmann**, manager. Mr. Coe has been manager of the division's plant at Ft. Wayne, Ind., operations of which will be transferred to Decatur.

* * *

MR. Coe joined General Electric in 1915 in the laboratory of the Pittsfield Apparatus Works where he remained until 1922, when he became foreman of the molded insulation section, forerunner of the Plastics Division. Mr. Coe was foreman of the molding and finishing section of the Pittsfield Plastics Plant until 1941 when he was named assistant to the manager of the Fort Wayne Plastics Plant. He was made manager of that plant the following year.

* * *

F. Jules Keller Heads Steel Equipment Company

F **Jules Keller**, until recently Vice President and General Manager of the **Wean Equipment Corporation**, formerly known as the Broden Construction Company, has been named to the presidency of the **Steel Equipment Company.**

F. Jules Keller, President
Steel Equipment Company

* * *

MR. Keller has spent the greater portion of his life designing and manufacturing machinery for the steel industry and brings to the Steel Equipment Company a wealth of knowledge and experience.

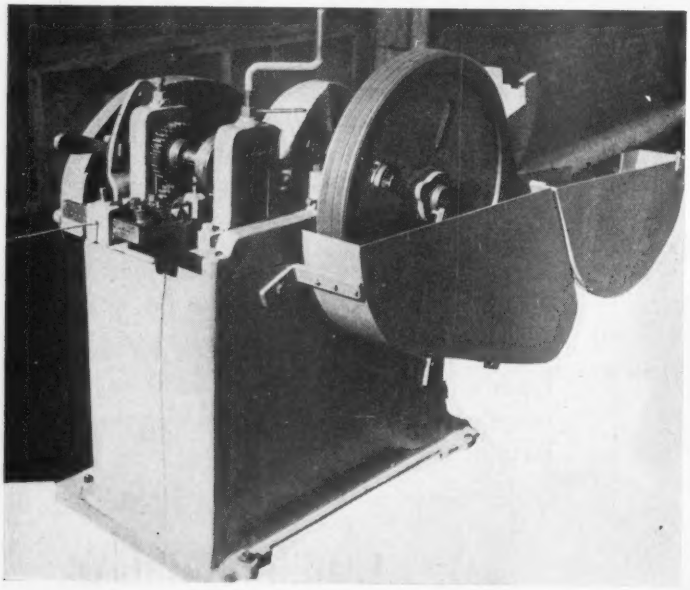
* * *

THIS company manufacturers wire drawing machinery, tinning, spooling, galvanizing and patenting equipment and makes a full line of machinery for the cold processing of strip steel.

* * *

WITH Mr. Keller are **Nelson E. Burdick**, Vice-President in charge of Operations, and **Michael E. Sanera**, Chief Engineer. The company's plant and offices are at 2890 E. 83rd Street, Cleveland 4, Ohio.

* * *



MOST RAPID STAPLE CUTTER EVER MADE

MAKES FENCE STAPLES — POULTRY NETTING STAPLES — DOUBLE POINTED TACKS

Moderately priced — Belt or motor driven.

Write for full details of HUMPHREY RAPID FENCE STAPLE MACHINE.

Prompt deliveries now possible.

REED and RICHARDS TRANSATLANTIC, INC.

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REG. CABLE ADD.: "LOUREED, NEW YORK".

Wire Bale Tie Machines

For export only: Double-Gear Windmills & Pump Jacks

Resigns After Forty-Seven Years of Service

C. G. **Stoll**, president of the **Western Electric Company**, recently announced that **William F. Hosford** had resigned as director and vice-president in charge of operations for the Company. Mr. Hosford's resignation became effective May 31st and coincided with his retirement after nearly forty-seven years of service with the Company. The Company's board of directors has elected **Stanley Bracken**, vice-president in charge of manufacture, to the post of executive vice-president. **H. C. Beal**, engineer of manufacture, has been elected director and vice-president to succeed Mr. Bracken. **F. J. Feely**, who continues as manager of Western Electric's Buffalo Shops and Electronics Shops, becomes engineer of manufacture in addition to his other duties.

* * *

Morsch Appointed Ross L. A. Manager

THE new manager of the Los Angeles office of the J. O. Ross Enginering Corporation is **Richard W. Morsch**, who for the past ten years made his headquarters at the New York offices of the firm. He succeeds **W. A. Schoenbeck** who is returning to the New York office.

Richard W. Morsch, M. Ross Los Angeles Office

* * *

MR. Morsch is a graduate of the University of Colorado and joined the Ross organization in 1937 as a specialist in heat treating of magnesium and aluminum. With headquarters in Los Angeles, he will direct all sales and engineering in connection with the firm's varied line of air processing systems in the Pacific Coast territory.

* * *

Holton to Manage Carboloy Newark Office

APPOINTMENT of **Paul H. Holton** as manager of the Atlantic District Office, 1060 Broad Street, Newark, New Jersey, has been announced by **K. R. Beardslee**, Vice President in Charges of Sales, **Carboloy Co., Inc.**, Detroit, Mich. Mr. Holton, who has been a Sales Engineer in the Philadelphia area of the Carboloy Company since 1937, succeeds T. D. MacLafferty who resigned effective March 1st.

Chester A. Kellogg Dies Suddenly

CHESTER A. Kellogg, chief of metallurgy and inspection, Continental Steel Corporation, Kokomo, Indiana, died June 2nd, at his home in Kokomo of a heart attack.

* * *

BORN September 21, 1892, at Chesterton, Indiana, Mr. Kellogg had been connected with Continental since 1930. Prior to that time he was employed by the Keystone Steel and Wire Company, Peoria, Illinois, and the Carnegie Illinois Steel Corporation, South Chicago.

* * *

Mr. Kellogg attended common schools at Chicago and was graduated from Hyde Park High School. Afterward he attended the University of Illinois. He was a member of the American Society for Testing Materials, the American Institute of Mining and Metallurgy, and the Wire Association.

* * *

THE Directors and Officers of the Wire Association greatly regret the untimely passing of Mr. Kellogg, who was one of the early members of our organization, taking an active interest in its affairs and on several occasions presenting excellent technical papers at the annual conventions. Our sincere sympathy is extended to his former associates in Continental Steel Corporation and to his family.

* * *

Talon, Inc., Buys Wilson Fastener Co.

TALON, Inc., recently purchased the Wilson Fastener Company, Cleveland.

* * *

THE Wilson plant will be kept in operation as a wholly-owned subsidiary of Talon, Inc.

* * *

PAUL Schick, who has been with the Carboloy Company for the past five years and recently attached to the Carboloy training course at the Carboloy plant in Detroit has been appointed to succeed Mr. Holton at the Philadelphia branch.

* * *

Required Reading

EVERY American citizen should read the pamphlet "Communist Infiltration in the United States", published by the Chamber of Commerce of the United States, Washington 6, D. C. This booklet provides a dispassionate presentation of the facts and tells the nature of this menace to our freedom and how it can be combatted.

* * *

The Wire Association is for the specific purpose of improving production methods. It has been organized as a clearing house of ideas on technical problems and research work in all phases of practical wire drawing and wire working.

The inquiries discussed were received from and answered by members of the Wire Association. These inquiries are sent to the Secretary of the Association who acts as a central clearing point, and neither the names of the firms, nor individuals sending the inquiry, nor of the men or firms replying are divulged without permission.

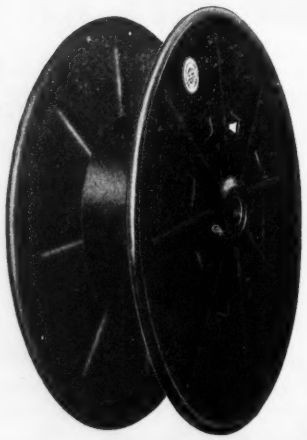
MOSSBERG PRESSED STEEL CORP.

Greater service from a new All Welded Steel Take Off Reel designed to meet present day requirements.

Usual maintenance expense eliminated by adoption of this new design wherein all parts are welded into one homogeneous unit.

Reel sides are embossed with radial reinforcing ribs for increased rigidity with rolled edges for additional strength and to facilitate handling.

Complete line of spools and reels for both processing and shipping all kinds of bare and insulated wires and cables. (Send for Catalogue W-104)



All Welded Steel Take Off Reel

MOSSBERG
Pressed Steel Corp.
18 WEST STREET
ATTLEBORO, MASSACHUSETTS, U. S. A.

James Day (Machinery), Ltd., "Ford House," 88 Regent Street, London, W. I., England.

A Review of Recent Wire Patents

No. 2,420,127, CORROSION PREVENTIVE COMPOSITION, patented May 6, 1947 by George L. Doelling, St. Louis, Mo., assignor to Wagner Electric Corp., St. Louis, Mo., a corporation of Delaware.

This composition consists of approximately 64% blown castor oil, 26% isopropanol, 4.5% calcium ricinoleate, 2.7% sodium ricinoleate, 0.8% potassium ricinoleate, and 1.7% water, these percentages being by weight.

★ ★ ★

No. 2,420,156, DEVICE FOR ELECTROMAGNETIC DEFLECTION OF A CATHODE-RAY, patented May 6, 1947 by Harold van Suchtelen, Eindhoven, Netherlands, assignor to Hartford National Bank and Trust Company, Hartford, Conn., as trustee.

For use in cathode ray tubes, the device consists of a coil of two series of active conductors, there being terminals so angularly spaced to produce resultant fields of maximum flux and zero flux alternating progressively about said winding.

★ ★ ★

No. 2,420,377. METHOD OF BRIGHTENING TINNED STRIP, patented May 13, 1947 by Carl G. Jones, Youngstown, Ohio.

This method comprises progressively moving the strip longitudinally in a predetermined path while progressively heating it until it attains, at a point on said path, a temperature of approximately 437° F., further heating it to a temperature higher than the melting point of the tin coating but at a slower rate per unit of travel and, on attainment thereof, immediately cooling it in a gaseous medium to approximately the first mentioned temperature, and then quenching it in a liquid quenching medium to a temperature substantially below the first mentioned temperature.

★ ★ ★

No. 2,420,403, ELECTRODEPOSITION OF IRON, patented May 13, 1947 by William B. Stoddard, Jr., Hamilton, Ohio, assignor to The Champion Paper and Fibre Company, Hamilton, Ohio, a corporation of Ohio .

In order to obtain smooth, fine-grained deposits of iron, the inventor passes an electric current through the bath while maintaining therin, as a catalytic refining agent, at least one-tenth gram per liter of soluble manganese in the form of a divalent salt such as manganous chloride and manganous sulfate, the pH of the bath being between 1 and 4.5 but not sufficiently high to cause a coarse grain structure of the deposited iron.

★ ★ ★

No. 2,420,511, APPARATUS FOR FORMING AND ASSEMBLING INNER SPRING CONSTRUCTIONS. patented May 13, 1947 by Edward E. Woller, Kenosha, Wis., assignor to Simmons Company, New York, N. Y., a corporation of Delaware.

There are fourteen claims in this patent for a machine to form springs according to the method below.

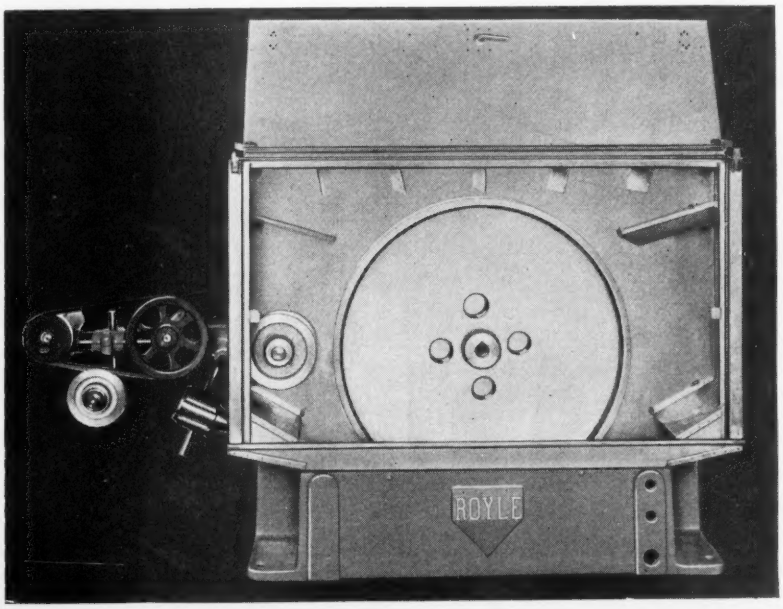
★ ★ ★

No. 2,420,512, METHOD FOR FORMING AND ASSEMBLING INNER SPRING CONSTRUCTIONS, patented May 13, 1947 1947 by Edward E. Woller, Kenosha, Wis., assignor to Simmons Company, a corporation of Delaware.

This method consists in providing coil springs having normal circular or spirally formed terminal coils and positioning the same with their terminal coils in predetermined juxtaposition, gripping these terminal coils to hold the same and, as an incident to such gripping of the coils, forming an offset in one of the coils and winding a helix around this offset and the juxtaposed coil portion of the other spring while the terminal coils are held in this juxtaposition.

★ ★ ★

Complete Description and Drawings of Patents May Be Had for 50 cents, outside the United States and Canada $1.00. Address, Wire & Wire Products, 300 Main St., Stamford, Conn.



The Royle 36" High Speed Capstan for Resin Insulated Wire

- Stainless steel watertight enclosure
- Total enclosure permits higher wire speeds
- More efficient wire puller stabilizes wire speed
- Secondary idler pulleys guide wire across capstan preventing rubbing and permitting larger quantities to be cooled simultaneously
- All bearing located outside of enclosure to prevent contact with water
- Quiet running
- Built-in air wiper

JOHN ROYLE & SONS

ROYLE PATERSON N. J. 1880

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

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JEfferson 3264
J. C. Clinefelter

Los Angeles, Col.
H. M. Royal, Inc.
LOgan 3261

PATERSON 3, NEW JERSEY

No. 2,420,602, ELECTROLYTIC CLEANING PROCESS, patented May 13, 1947, by Richard W. Kingerley, Jr., Lakewood, Ohio, assignor to E. I. du Pont de Nemours & Company, Wilmington, Del., a corporation of Delaware.

In a process for the removal of mineral oil from a ferrous metal following cold-rolling of the metal using the oil as a lubricant the inventor electrocleaning the metal in a silicate detergent solution comprising a sodium silicate having an SiO_2/Na_2O weight ratio from about 1.9 to 2.4, the weight ratio of total SiO_2 to total Na_2O in the solution also being in the range from 1.9 to 2.4.

* * *

No. 2,420,717, CROSS CHAIN FOR ANTISKID TIRE CHAINS, patented May 20, 1947 by John O. Mulderick, Monaca, Pa., assignor to S. G. Taylor Chain Company, Hammond, Ind., a corporation.

This heavy wire cross chain is so constructed that when the side link is turned at right angles to the adjoining side links its end portion can be inserted in an opening in the end link and passed under the free end of the hook to connect and disconnect the two links.

* * *

No. 2,420,804, TIRE CHAIN, patented May 20, 1947 by Joseph L. Wenzel, Kansas City, Mo.

Included is a stiff, arcuate section, adapted to interconnect the ends of the flexible tire chain section and embrace the rim of the tire supporting wheel. The arcuate section comprising a U-shaped body having coupling elements at the bight thereof, there being a number of arcuate cross bars fixed to the legs of the U-shaped body.

No. 2,420,936, FLYING COILER, patented May 20, 1947 by Floyd E. Davis, Gary, Ind.

This coiler for rods, etc., comprises opposed rotatable drums, a device for rotating the drums in synchronism prior to gripping the rod therebetween, mechanism for moving at least one of the drums toward and away from the other, and means for limiting the movement of the drums together to establish a gap between the edges of the drums slightly less than the thickness of the rod to be gripped therebetween.

* * *

No. 2,420,940, CULINARY VESSEL AND RACK THEREFOR, patented May 20, 1947 by James W. Eldridge, Pasadena, Calif.

The rack is constructed of wire.

* * *

No. 2,421,261, HARDWARE AND SCREEN CLOTH MACHINE, patented May 27, 1947 by Noah S. Harter, Waukegan, Ill., assignor to The American Steel and Wire Company of New Jersey, a corporation of New Jersey.

* * *

This assembly includes a mechanism for feeding wires from ways and weft supplies into interwoven association with each other to form fabric, means for maintaining an uninterrupted and continuous fabric take-up after the formation thereof including a drum frictionally engaging the fabric, a gripper drum positively gripping the fabric, means for positively driving said friction drum, and driving connections between the friction and gripper drums including a friction clutch.

No. 2,421,268, METHOD AND APPARATUS FOR MAKING AIR INSULATED CABLE, patented May 27, 1947 by Hans D. Isenberg, Wilmette, Ill.

A device is provided for continuously longitudinally moving a wire conductor cooperating with a device operated in timed relationship therewith for continuously winding a filamentary element of insulating material around a wire conductor to form helical convolutions spaced along the length of the conductor and surrounding it, there being provided means operated in timed relationship with the last-named device.

* * *

Industrial Uses of the Precious Metals

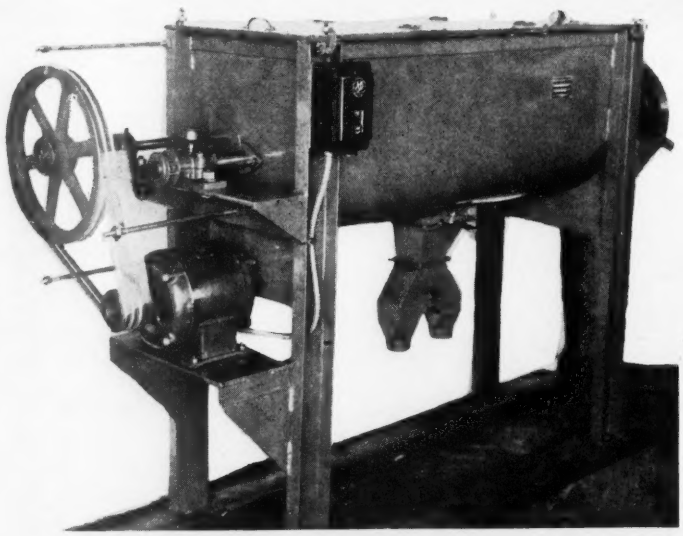
IN a talk presented before the Metals Science Club's monthly meeting in New York in May, **E. M. Wise** discussed the importance of the platinum metals in modern industry. Approximately $1,500,000,000. worth of precious metals are produced annually and of this about 7% of the gold, 40% of the silver and practically 100% of the platinum group metals (platinum, palladium, iridium, ruthenium, rhodium and osmium) are employed in the arts and industries of the world.

CHEMICAL **MIXERS**

Horizontal Batch and Continuous Types made in 1 cu. ft. to 235 cu. ft. capacities, Either Jacketed or Plain.

Custom Mixers Engineered To Suit Requirement of User.

Also make Grinders, Crushers, Elevating and Conveying Equipment, Commercial Type Pressure Cookers, Stranders, Closers, Wire Winders and a General Line of WIRE MACHINERY.



The machine illustrated above is a horizontal mixer.

Put your mill equipment problems up to the

HUGHESVILLE MACHINE and TOOL COMPANY

HUGHESVILLE, PENNA.
Phone: 129-A

WIRE AND PROCESS MACHINERY

THOMAS S. HUGHES
33 Admiral Road
Toronto 5, Ont., Can.

MR. Wise described the corrosion resistance of these metals and their contribution to various industries. He pointed out their use in the manufacture of rayon and glass fibers, and in telephone relay contacts where reliability contributed much to the continued operation of the dial systems during the recent troubles. Age-hardening phenomena as related to high strength dental alloys and uses of the precious metals in the jewelry and allied artistic fields were summarized.

* * *

THE speaker pointed out that a single small platinum alloy spinnerette in the course of its life produced as much as 9,000 lbs. of 150 denier rayon — enough to reach two-thirds the distance to the moon. He also indicated that platinum had made possible the glass fiber industry and the long-life aircraft spark-plug employed in the aircraft which won the Battle of Britain. This same type spark-plug is now available for civilian use and permits smooth operation of aircraft engines with extremely lean and more efficient mixtures.

* * *

MR. Wise is in charge of the Section of Platinum Metals and Electronics of the Development and Research Division of **The International Nickel Company, Inc.,** in New York, and has been in charge of the technical development of platinum metal uses for the past twenty years.

* * *

Labor Relations

(*Continued from page* 507)

information from management's side, they point out. If union negotiator cites a plant in Worcester, Mass. on vacations with pay agreements, the negotiator for management can then check for accuracy of the assertion and also for any counter balancing terms of the Worcester agreement.

* * *

MOST weighty of the arguments presented on the side of a common front is this; already the pattern is being set by negotiations between "big steel" and Mr. Phil Murray and his associates in the steel workers leadership.

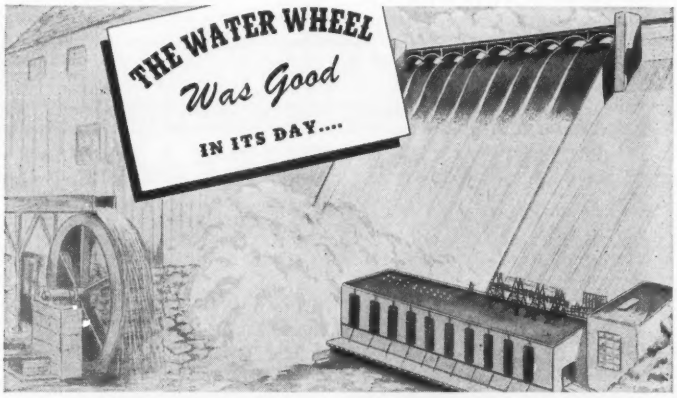
BEHIND the scenes on management's side is reputed to be an informal strategy committee, composed now entirely of basic steel men and representatives of integrated plants.

* * *

IF the pattern is to continue to be set by these negotiations, and there are many indications that it will, it is time for fabricators to acquire a voice in the informal strategy committee.

* * *

IN brief, the tendency appears to be toward nation-wide agreements, a tendency which many manufacturers believe is not entirely an unmitigated evil. Labor has marshalled its forces and its statistics on a nation-wide basis. If the independent fabricator is not to be left out in the cold and be forced to accept decisions of "big steel" without having a voice in their formulation, these proponents argue, it is time for him to step in and play the game the way it is being played by others.



BUT . . .

Now it is more picturesque than practicable. Power-plant development and other scientific advances have made modern industry possible.

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RUST PROOFING AND PAINT BONDING
Granodine *
Duridine *
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RUST REMOVING AND PREVENTING
Deoxidine *
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PICKLING ACID INHIBITORS
Rodine *

Rodine*

has led the way to comparable improvement in pickling methods. It assures a high degree of control in both sulfuric and muriatic acid pickling. It minimizes the attack on good metal, prolongs the life of the pickle bath and saves acid and iron. The chances of overpickling and the attendant acid embrittlement are greatly reduced with Rodine.

Picklers find that Rodine keeps down fumes and greatly improves working conditions in general.

There are grades of Rodine to meet every pickling problem. Your inquiries are solicited.

* Trade Mark Reg. U. S. Pat. Off.

AMERICAN CHEMICAL PAINT CO.
AMBLER ACP PENNA.

Wire Association Pacific Coast Meeting

Details of the 5th Annual Regional Meeting of the Wire Association, held at the Biltmore Hotel, Los Angeels, Cal., June 6th, 1947.

THE annual Pacific Coast Regional meeting of the Wire Association, held at the Biltmore Hotel, Los Angeles, Cal., on June 6th, proved to be the best and most successful held to date.

* * *

WITH a splendid program and an attendance of 125 the meeting, under the direction of Ken Davis, Pres. The K. H. Davis Wire and Cable Co., Los Angeles, Cal. went over smoothly and with great interest to the group.

* * *

DURING the afternoon preceding the meeting the Wire Association held open house at the Association Headquarters in the Biltmore Hotel.

* * *

IMMEDIATELY preceding the dinner there was a cocktail party and at the dinner, where Ken Davis acted as Toastmaster, a splendid address in present day problems in the United States was given by Mr. E. C. Hummel, President, Utility Electric Steel Foundry of Los Angeles and Regional Vice President of the National Association of Manufacturers. Mr. Hummel's address will be published in **Wire & Wire Products** at a later date.

* * *

AFTER an intermission, the technical meeting was held. The feature was a paper by **A. R. Zapp,** manager **Carbide Div. Firth Sterling Steel & Carbide Corp.** entitled "New Development in Tungsten Carbide". Owing to the unavoidable absence of the author the paper was most acceptably presented by Mr. Wade H. Davis, Pacific Coast manager. The Firth Sterling Steel & Carbide Corp. The paper will be published in **Wire & Wire Products** at a later date.

* * *

PRECEDING the paper a sound motion picture showing the manufacture and fabrication of Impregnated Paper-Insulated Cable was presented through courtesy of the Okonite Co. of Passaic, N. J. and following the paper a sound motion picture, showing the production and fabrication of ferrous wire and wire products was presented by courtesy of the American Steel & Wire Company, Cleveland, O.

* * *

AFTER the meeting closed, open-house was held in Wire Association Headquarters and also by the Firth Sterling Steel and Carbide Corp.

* * *

FROM every viewpoint the meeting was highly successful and it was the widely expressed opinion that these meetings should be developed and expanded.

* * *

THE following list of companies were represented in the attendance:

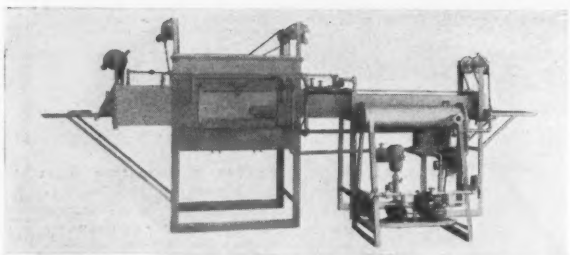
Acme Steel & Wire Co.	Los Angeles, Cal.
Aluminum Co. of America	Los Angeles, Cal.
Anaconda Wire & Cable Cable Co.	Los Angeles, Cal.
Avalon Company	Los Angeles, Cal.

1926 – pioneered the first practical controlled-atmosphere furnace

"Certain Curtain" ELECTRIC FURNACES

TODAY – providing the most advanced types of controlled-atmosphere furnaces

"CERTAIN CURTAIN" ELECTRIC FURNACES



TYPE LA

For CLEAN annealing, copper brazing, silver soldering in Controlled Atmosphere

The famed "Certain Curtain" control conquered the most difficult atmospheric problems in high speed steel treating. These same patented methods are available in equipment expressly designed for clean annealing, copper brazing and silver soldering at temperatures up to 2000°F. Conveyor and batch types. Additional external atmosphere generator available. "Certain Curtain" equipment dissociated ammonia or hydrogen assuring the utmost in economical protection for every operation.

AVAILABLE ALSO IN CONVEYOR TYPES AND IN VARIOUS CAPACITIES

Write for "CATALOG 108"

C. I. HAYES, INC. 129 Baker St., Providence, R. I.

Bethlehem Pacific Coast Steel Corp.	Vernon, Cal.
California Spring Co.	Los Angeles, Cal.
California Steel Co.	Los Angeles, Cal.
California Wire Cloth Co.	So. San Francisco, Cal. and Los Angeles, Cal.
Carboloy Co., Inc.	Huntington Park, Cal.
Carter Wire Products	Los Angeles, Cal.
Central Metal Products	Los Angeles, Cal.
Cherry Rivet Co.	Los Angeles, Cal.
Colorado Fuel & Iron Corp.	Denver, Colo.
Columbia Steel Co.	Los Angeles, Cal.
K. H. Davis Wire & Cable Co.	Los Angeles, Cal.
K. H. Davis Mfg. Co.	Los Angeles, Cal.
Deeco, Inc.	Burbank, Cal.
Ducommun Metals & Supply Co.	Alameda, Cal.
Electric Cords & Supply Co.	Los Angeles, Cal.
Essex Wire Corp. of California	Anaheim, Cal.
Firth Sterling Steel & Carbide Co.	Los Angeles, Cal.
General Cable Corp.	Los Angeles, Cal.
Industrial Wire Products Corp.	San Francisco, Cal.
Kaiser Aluminum	Los Angeles, Cal.
Kaiser Steel Co., Inc.	Fontana, Cal.
Lorraine, Inc.	Los Angeles, Cal.
Natural Gas Equipment, Inc.	Los Angeles, Cal.
Norris Stamping & Mfg. Co.	Los Angeles, Cal.
Oakite Products Inc.	Los Angeles, Cal.
Pacific Coast Borax Co.	Los Angeles, Cal.
Pacific Tube Co.	Los Angeles, Cal.
Pacific Wire Rope Co.	Los Angeles, Cal.
Phelps Dodge Copper Products Inc.	Los Angeles, Cal.
Plomb Tool Co.	Los Angeles, Cali.
Precision Wire Products	Los Angeles, Cal.
Republic Steel Corp.	Cleveland,O.
Republic Steel Corp.	Los Angeles, Cal.
Russell Bolt Mfg. Co.	Los Angeles, Cal.
Russell, Burdsall & Ward.	Los Angeles, Cal.
Sierra Nevada Steel Co.	Los Angeles, Cal.
Union Drawn Steel Div. of Republic Steel Corp.	Los Angeles, Cal.
Utility Electric Steel Foundry	Los Angeles, Cal.
Vascaloy–Ramet Corp.	Los Angeles, Cal.
Western Insulated Wire Co.	Los Angeles, Cal.
Wire & Metal Mfg. Co.	Los Angeles, Cal.
Wire & Wire Products (a publication)	Stamford, Conn.

* * *

H-VW-M Electric Glue Heater

THE **Hanson-Van Winkle-Munning Co.**, Matawan, N. J., announces the development of a new portable electric glue heater.

* * *

THIS unit is well constructed, provides quick heat, automatically held at 150 to 160° F. by a thermostat and is thoroughly insulated to prevent heat loss. The removable glue pot is of copper, nickel plated for corrosion and wear resistance. A heavy duty, insulated electric cord is supplied with each heater.

* * *

THE capacity of the electric glue heater is 2 quarts. It is designed for regular 115 volt AC Current. Special units for 230 volt AC Current can be supplied.

Second Instrumentation Exhibit

OVER 90 manufacturers of instruments and devices for measurement, inspection, testing, and control have already signed up to exhibit their latest developments at the coming Second Annual Instrument Conference and Exhibit at the Stevens Hotel, Chicago, September 8-12, 1947, sponsored by the Instrument Society of America. The Exhibit will occupy twice the exhibit space of the first Exhibit in Pittsburgh in 1946.

. . . and paint it not with just one coat, but with 12 consecutive saturating and finishing coats, at the rate of 72,000 feet per hour! A real job for the application of heat in continuous processing operations . . . so the problem was turned over to IOI.

Result: IOI engineers constructed from standard component parts the installation shown above. This specifically designed system delivers 25% more production at 30% less attendant cost, operates over an .010" to .750" diameter range, and produces coated wire that tests higher for luster and concentricity of finish.

This system is typical of IOI's engineering versatility in applying its sound basic principle to the industrial processing of monofilament and web materials . . . *putting heat to work in continuous operations*

Complete details of IOI installations adaptable to your industry are available in booklet form. Copies will be sent upon request.

INDUSTRIAL OVENS, INC.

13825 TRISKETT ROAD CLEVELAND 11, OHIO

ASSOCIATED COMPANY: JAMES DAY MACHINERY LTD., LONDON W.1, ENGLAND

New Conveyor Belt

DEVELOPMENT of a woven wire conveyor belt which actually will turn corners is one of the most recent achievements of a North Chicago (Ill.) manufacturer who has become one of the country's leading producers of metal conveyor belts.

* * *

CYCLONE Fence Division of **American Steel & Wire Co.** and its North Chicago plant are well known producers and installers of protective and restrictive fence used around factories, institutions, schools, parks, athletic fields and the like. Though it has had several types of conveyor belts in production for years, not many know of this U. S. Steel subsidiary's importance in the conveyor belt field.

* * *

HERE'S a good illustration of what a **"Flex-Grid"** conveyor belt will do. Take a large bakery. When those thousands of hot loaves come from the ovens they have to be placed by hand in wire trays stacked high on push-trucks and rolled into a cooling room, there to remain for several hours. Then, laboriously, the trucks are rolled out again and the bread is wrapped and carried to the loading dock for hauling to the grocery store, hotel or restaurant.

* * *

NOW in the up-to-date large bakery, the loaves slide from the ovens onto a long "Flex-Grid" belt continuously passing the oven door, and are carried on it thru cooling, clean air to the wrapping machines, and then to the delivery trucks. If the belt must carry the bread to a floor above or below, it "does the job" cleaner, faster and with a lower handling cost. If the conveyor must approach the end of the room and turn, either at right angles or a full reverse turn — PRESTO! The "Flex-Grid" belt turns a corner and the brown loaves go merrily on their way.

Conveyor Belt in operation * * *

* * *

THIS conveyor belt is made from parallel wires linked together at both ends, thus forming a steel belt or chain. It can be furnished in carbon steel — uncoated, galvanized or tinned — or can be formed from the "darling of the future," stainless steel wire. In "single pitch" it operates as a straight line conveyor. In "multi-pitch" (depending on its width) it can turn corners with an inside radius of from 14 to 45 inches.

* * *

IN addition to **"Flex-Grid"** the North Chicago plant makes two other types of conveyor belts; chain link and flat wire or "door mat" belt. Chain link conveyor belt looks like the familiar Cyclone Fence. Chain link belts can be woven in

NOTICE TO SUBSCRIBERS

regarding the

WIRE & WIRE PRODUCTS BUYERS GUIDE AND YEAR-BOOK OF THE WIRE ASSOCIATION

The 1947 Edition of this useful directory may be obtained by subscribers at 40% discount from the list price of $5.00 per copy. So when ordering your subscription to WIRE and WIRE PRODUCTS, if you want a copy of the BUYERS GUIDE, please enclose $3.00, or send the order and ask us to bill you.

Members of The WIRE ASSOCIATION will continue to receive a copy of the BUYERS GUIDE as part of the service extended to them, and the cost is included in the dues.

To all others the price remains as heretofore $5.00 per copy.

THE BUYERS GUIDE is a complete directory of all kinds of wire and wire products manufactured in the country, together with listings of all machinery, equipment, supplies and services used by the Wire Industry.

It is an invaluable source of information on everything of interest to wire men. Be sure to order your copy early to be certain of getting one, as the edition is limited. Published in the Spring annually... Only $3.00 to subscribers.

WIRE and WIRE PRODUCTS

300 MAIN STREET STAMFORD, CONN.

any one of a hundred specification of wire and mesh, from 3 inch opening to 8 meshes per inch. To control "side creep" these belts are made with "right and left hand" spiral sections. That may sound like the left-handed monkey wrench, but in this case it is true, and no hoax. One section pulls against the other and the belt hauls straight and true. It can be fabricated of carbon steel (plain, galvanized or tinned,) stainless steel, aluminum, monel, copper, brass, or bronze to carry materials in process through any condition of heat, cold, water, acid, or alkali.

* * *

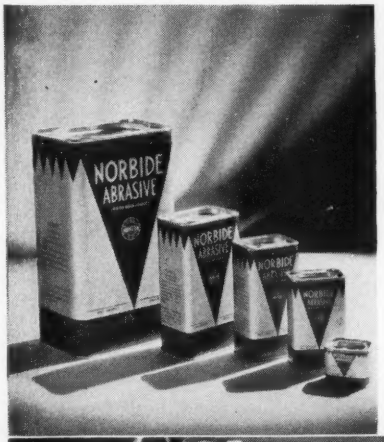
IF the load is heavy, or the width, length or heat too great for friction pulling, the belt can be side-equipped with the most appropriate chain; cross-braced with steel rods, flats or angle irons; and driven by sprockets. If the belt must run up or down grade, flight barriers are provided. Side plates to prevent the load from rolling off are available, if needed.

* * *

MADE especially for vegetable and fruit canning, but also well adapted to many other uses, flat wire, or "door mat," belt is produced in 1″ x 1″, 1/2″ x 1″, and 1/2″ x 1/2″ meshes and in any width in galvanized, carbon and stainless steels. As all Cyclone belts, it is extremely flexible.

* * *

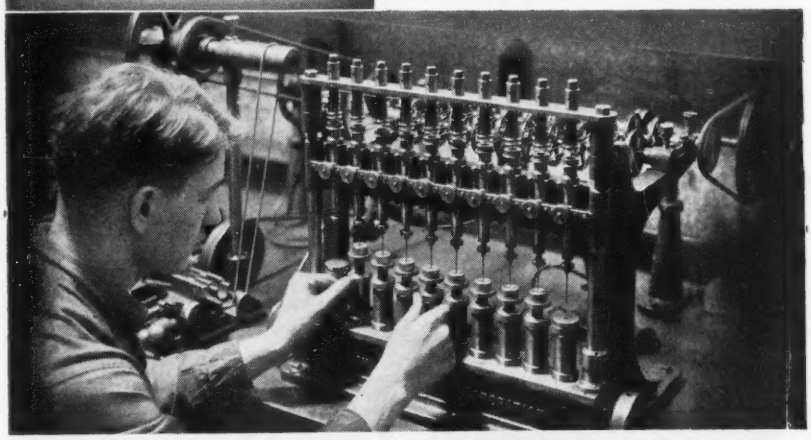
TODAY, in many plants, woven metal conveyor belts are hard at work assisting in the production of a surprising variety of products. They carry products or materials out of ovens for cooling without being harmed by the intense heat. In other operations, the conveyor belts are immersed in water, oil, or acid where, not only are they unaffected by the immersing liquid, but their porous woven construction enable them to drain or be cleaned, quickly-ready for the next round. Being woven to specific mesh widths enables metal conveyor belts — industry's "silent servant" — to handle the grading or selection of produce or minerals.



NORBIDE ABRASIVE
For Cemented Carbide Dies

NORBIDE Abrasive is successfully used for cutting and semi-finishing cemented carbide wire drawing dies. This abrasive is second only to diamond powder in hardness and is 150 times less expensive. Sizes 220 and 240 for ripping; 320F for semi-polishing; 500 to 800 for final finishing.

NORTON COMPANY
WORCESTER 6, MASSACHUSETTS



The Wire of a Thousand Uses

JOHNSON XLO MUSIC SPRING WIRE gives you maximum tensile strength, absolute uniformity of all physical properties now available with special corrosion resistant coating. Johnson special alloy coating has definite lubricating qualities, reducing tool wear, perfect base for soldering or plating. Withstands 700° Fahrenheit. Sizes .003" to .080".

Your nearest Johnson branch will give you prompt service.

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TUNGSTEN — CARBIDE

DIES

COLD HEADING and EXTRUSION DIES

Wire Drawing Dies — Tubing Dies — Coating Dies — Sizing Dies —Ring Gauges — Cut-off Quills. Also Manufacturers of Diamond Dies & Diamond Powder.

For Immediate Delivery on Standard Boltmaker & Extrusion Dies, Wire Drawing & Tubing Dies, Address Inquiries to: —

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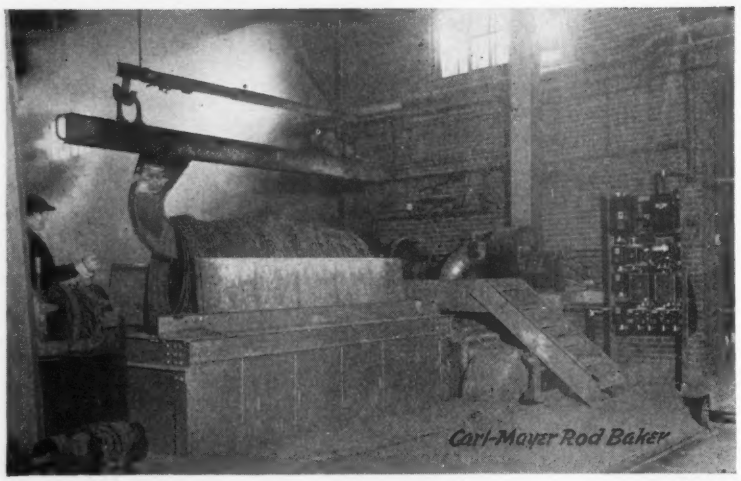
Phone: Pingree 5702

MORE PRODUCTION
***with* CARL-MAYER HI-SPEED**
ROD BAKERS - OVENS - FURNACES



Patented

TYPICAL HI-SPEED ROD BAKER — DIRECT OR INDIRECT HEAT — ANY FUEL

WRITE for BULLETIN No. 241

Growing interest in our type of equipment is evidenced by Carl-Mayer installations for such plants as:—

American Steel & Wire Co.
Atlantic Wire Co.
Atlas Steel Co.
Atlas Tack Corp
California Wire Cloth Corp.
Eaton Mfg. Co.
Frost Steel & Wire Co. Ltd.
Hollup Corp.
Johnson & Nephew Ltd.
Jones & Laughlin Steel Corp.
Pittsburgh Tool Steel Wire Co.
Republic Steel Corp.
Steel Co. of Canada
Wickwire Spencer Steel Div.
Page Steel & Wire Co.

THE CARL-MAYER CORPORATION 3030 EUCLID AVENUE CLEVELAND, OHIO

Philips Announces Variable Capacitor

AVAILABILITY of a new air-dielectric variable capacitor having a range of 30-1 between minimum and maximum capacitance has been announced by **North American Philips Company, Inc.**, 100 East 42nd Street, New York.

* * *

THIS new condenser is designed for use in commercial radio communication and industrial electronic applications and is virtually impervious to mechanical shock. Under the most adverse conditions to which radio equipment is subjected, vibration capacitance modulation is negligible.

* * *

THE capacitor has a flash rating of 500 volts and the capacitance is adjustable from 5 mmf. (minimum) to 150 mmf. (maximum) by rotation through 5,000 degrees. The capacitance curve is substantially linear with rotation, and no reversals occur throughout the entire range.

New Industrial Storage Battery Introduced

A cadmium nickel alkaline storage battery which combines advantages of lead acid and nickel iron alkaline batteries is being introduced to industry by Baker and Company, Inc., Newark, N. J., refiners of precious metals.

* * *

USED in Europe for the past twenty years, the cadmium battery has been perfected by Baker technicians to fit the needs of a wide variety of industries.

* * *

CHIEF benefit of the battery, the company states, is that it accomplishes alone what was formerly done by a lead acid battery and nickel iron alkaline battery, in addition to possessing features of its own.

* * *

THE Baker battery accepts high or low charge rates with no finish rate limitations, it is pointed out, and has excellent capacities at low electrolyte temperatures with

no danger of damage due to freezing. It has a minimum spread between its charge and discharge voltages and is ideal for "floating" service applications. The battery has low internal resistance and will not self-discharge on open circuits.

* * *

New Silver Paste Brazes Carbide Tips

USERS of carbide tool tips will be interested in a simplified method of brazing these tips to steel shanks.

* * *

THE complicated procedure of cutting silver alloy foil to shape, preplacing so it doesn't slip, smearing flux, then having failures because too much or too little flux was used, silver alloy scrap losses, uneven flow, etc., is said to be eliminated by the use of Nu-Braze silver alloy DIFFUSION PASTE #50, made by **Sherman & Co.**, 197 Canal St., New York 13, N.Y.

* * *

THE paste was developed specifically for brazing carbide tips. It consists of a new silver brazing alloy finely pulverized and then ground with a correct proportion of a special flux.

* * *

THE flux contained in this paste begins to melt at 480° F and protects both the carbide tip and the steel joint area with a liquid protective film before the heat-generated oxides can form. The viscosity of the flux is so low that the molten brazing alloy component gently eases all of it out of the joint.

* * *

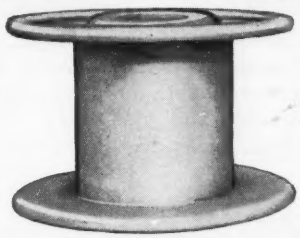
Dyed Fiberglas Identification Yarns Available in Nine Colors

DYED Fiberglas yarns, for use as identification yarns for electric wires and cables, are now being produced in the following colors: blue, orange, green, yellow, black, brown, slate, red and purple.

* * *

PRODUCTION of dyed Fiberglas identification yarns in a variety of colors has been made possible by development of a new process of film coating whereby the yarns can be dyed with ordinary dyes and by commonly used methods.

FOR HIGHEST SPEEDS

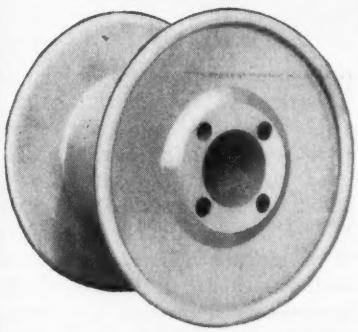


APCO MOSSBERG

PRECISION

STEEL REELS

The reels that are engineered to the job... designed and built by the company that originated the steel reel idea . . . are the reels you should be using in your plant. Every year, more and more Apco Mossberg Steel Reels are bought by quality-minded buyers throughout the wire industry.



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ENGINEERING SERVICE

Without obligation to you, Apco Mossberg engineers will be glad to study your reel problem, and supply complete suggestions, drawings, blue prints. Write for information today

REELS . . . SPOOLS . . . BOBBINS

APCO MOSSBERG COMPANY

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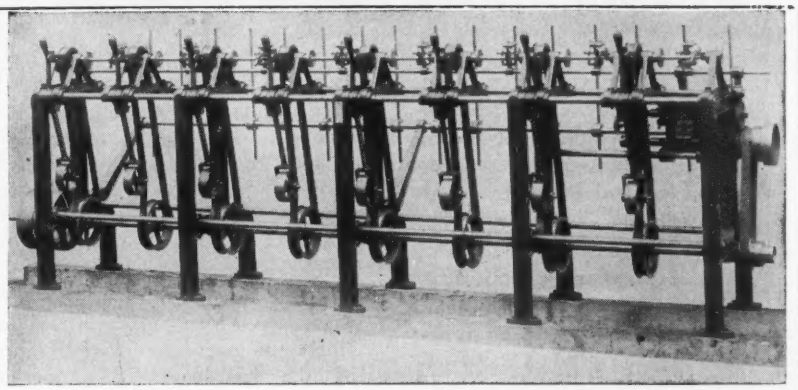


No. 1900E SPOOLER

WIRE SPOOLING MACHINES

Model illustrated takes spools up to 12" diameter. Floor space required: 19" x 10'; length can be varied to suit largest spool specified. Handles wire up to .050" diameter. Other models made to suit specific requirements.

EMORY SPOOLERS are built for years of continuous service. Precision made, durable, rugged, dependable.

BUILDERS OF WIRE SPOOLING MACHINERY for A HALF CENTURY

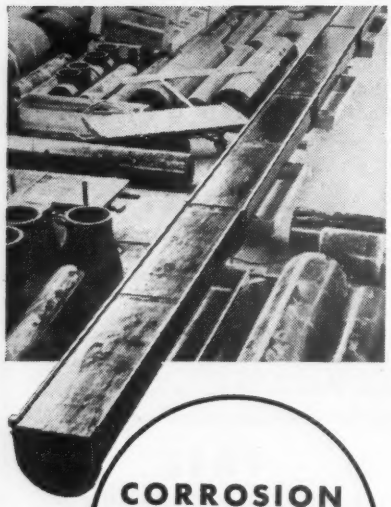
For details, write to

ROBERT J. EMORY COMPANY

NEWARK 5, N. J.

31 East Runyon Street

Telephone Bigelow 3-4415



CORROSION RESISTANCE
That's More Than Skin Deep

It's HAVEG
All The Way Through

Corrosion eats into profits by eating into equipment—resulting in heavy maintenance and replacement costs.

Reduce that expense by using HAVEG for process equipment wherever possible — for tanks, towers, coolers, piping, valves, pumps, fume ducts and similar applications.

HAVEG is a molded structural material resistant to chemical action throughout its entire mass. *It is not a lining or coating* to become ineffective when damaged by surface abrasions or scratches.

Bulletin F-5 gives complete design, engineering and application data. Send for it today.

HAVEG
CORPORATION
NEWARK 47, DELAWARE

CLEVELAND 14 CHICAGO 11 HOUSTON 6 DETROIT 11 LOS ANGELES 13

The protein film, applied to the yarns as they are formed, represents only one to two per cent, by weight, of the finished yarns, but with this small amount of film improved depth of color has been obtained. The yarns are resistant to heat, moisture and fungi.

* * *

DYED Fiberglas yarns are supplied for use as marker yarns which identify the manufacturers of most types of wire and cable produced according to Underwriters' Laboratories standards, such as rubber-covered wire, nonmetallic-sheathed building cable, flexible cord and fixture wire. In such constructions, the yarn is laid parallel to the conductor. The purpose of a marker yarn in these wires and cables is to enable field inspectors to determine the company and factory which produced the wire sold commercially for home and industrial wiring. The high strength of glass makes it possible to use a fine yarn and thereby hold down manufacturing costs. Dyed Fiberglas yarn will not form gas pockets under high temperature extruding conditions.

* * *

DYED Fiberglas yarns are also supplied for use as circuit tracers in braided cable covering, such as radio hook-up wire and aircraft cable. Here the dyed Fiberglas yarns are braided over the primary insulation in combination with white yarns, or in solid colors, to form color codes. The dyed yarns are resistant to solvents which are normally used in applying the lacquer coating on such wires.

1946 Book of A.S.T.M. Standards, In Five Parts (Over 1400 specifications and Tests, almost 7000 Pages)

WITH more than 1400 standards, specifications, tests and definitions for a wide range of material, and containing almost 7000 pages, the 1946 Book of Standards has been issued in five parts instead of the former three volumes.

IF YOUR...
DIE ROOM IS DEAD
WITH HAND WORK
WAKE IT...
UP
WITH
ROOS AUTOMATIC DIE FINISHING MACHINERY
STEP UP...
EFFICIENCY
AND PRODUCTION OF MORE AND BETTER
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Supplements, Detailed Index

TO keep the books up to date, a supplement will be issued to **each** part late in 1947. As a service with the 1946 Book of Standards there is a complete 240 page Index to Standards, which is furnished without additional charge. (The 1946 Index is in course of publication, to be available about June 20.)

SALES PRICES
1946 BOOK OF A.S.T.M.
STANDARDS

Cloth Binding. For Half Leather, add $2.00 for **each** part.

Parts IA, IB, IIIA, or IIIB	$ 8.00 each
Part II	$12.00
A complete Set of All Five Parts	$44.00
1946 Book of Methods of Chemical Analysis of Metals	$ 4.50

* * *

COPIES may be obtained from the American Society for Testing Materials, 1946 Race St., Philadelphia 3, Pa.

* * *

This book carries the A.S.T.M. specifications and tests in their latest approved form.

* * *

THE great growth in the number and volume of standards and tentatives compelled a division of the book into five separate parts as follows:

Part IA — Ferrous Metals
Part IB — Non-Ferrous Metals
Part II — Nonmetallic Materials — Constructional
Part IIIA — Nonmetallic Materials—Coal and Coke, Petroleum Products, Aromatic Hydrocarbons, Soaps, Waters, Textiles, Gaseous Fuels.
Part IIIB — Nonmetallic Materials — Electrical Insulating Materials, Plastics, Rubber, Paper, Shipping Containers, Adhesives.

* * *

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* * *

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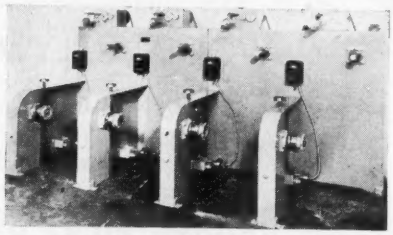

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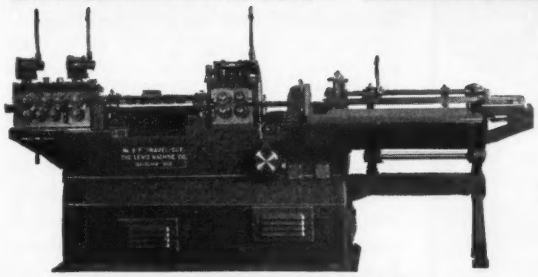

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* * *

The World Situation on Coating Materials, Lead, Zinc and Tin

(*Continued from page* 510)

was sustained quite well with only a few plants badly damaged during the invasion. Mines and works in Upper Silesia are reported restored to Poland and nationalized by the Polish Government. Former German capacity has been divided, some being in the Russian zone of occupation and some in the British zone. The French total requirement this year will leave a sharp deficit to be met by import. Operation of mines and works at Sardinia and an electrolytic plant at Crotone in Southern Italy, which left Axis control in 1943, were at a virtual standstill until late 1945,

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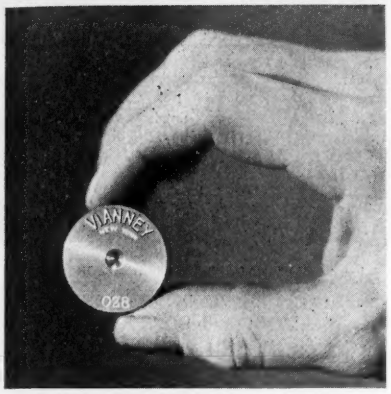

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when steps were taken to resume production.

* * *

ZINC supplies are tight and likely will continue scarce as long as domestic consumption stays at the existing high level and until production in foreign countries picks up. Lack of fuel is holding production in Belgium to about 75 per cent and in France and Norway to about 50 per cent. Higher prices abroad are attracting zinc from Mexico which normally is shipped to American users.

* * *

THE tin can is common-place to our everyday living, yet it is questionable if many of its beneficiaries know that the tin used to help make it may have come from far-off Singapore on the southern tip of the Malay Peninsula or perhaps from a little island in the Java Sea on the other side of the world.

* * *

THE United States is not a producer of tin ore. Aside from an earlier period when two smelting plants were operated for a short time on foreign ore, one in New Jersey and one in Long Island, it has only been since 1942 that we smelted tin in this country. A government-financed plant began operation five years ago at Texas City, Texas, operating entirely on ore from foreign countries, mostly from Bolivia.

* * *

TIN ore is found in widely scattered parts of the world, but is produced in quantities in relatively few countries. The principal ore-producing countries are Malaya, Netherlands East Indies, Bolivia, Nigeria, Belgium Congo, China, Siam, French Indo-China, and Burma. In the five year pre-war period, 1935-1939, Malay accounted for about 33 per cent, Netherlands East Indies about 18 per cent and Bolivia about 15 per cent of the world's supply of tin contained in ore. In some instances, smelters are located in close proximity to the ore deposits, whereas in other instances the ore is transported quite a distance. As an example, Bolivia, which has no smelting capacity, ships her entire pro-

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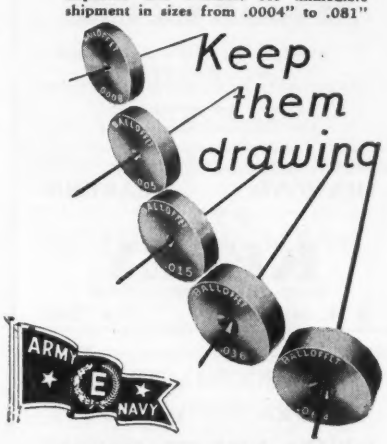

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duction of tin ore to other countries, principally to the United States and England.

* * *

OCCURRENCE of tin-bearing minerals has been reported in several areas of the United States, but to date no deposits have been found that warrant development. In the past 25 years, all mine production of tin in the United States and Alaska netted 750 gross tons, an average of 30 gross tons a year compared with this country's normal requirements of 80,000 to 85,000 gross tons of primary tin. Thus we find the largest tin-consuming nation in the world depending on others for its supply of this vitally-important commodity.

* * *

DURING the war years, shipments from the Far East countries, which had normally produced about 75 per cent of the world's tin supply, were completely cut off and production was practically at a standstill. After the surrender of the Japanese, stocks of tin totaling about 41,000 tons were found in various countries in the Orient. Because our position was uncertain, it was necessary early in the war to restrict the use of tin since we were dependent entirely on stocks previously accumulated by industry and the government and the production of the Texas City smelter, which began operating and turned out 15,695 tons in 1942. The plant produced 43,648 tons last year.

* * *

WORLD tin production is improving, but progress will be slow. The 1947 output is esti-

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mated at 50 per cent of the prewar rate and, while 1948 should show continued improvement, full production is not expected before 1949. Meanwhile, it probably will be necessary to continue some restrictions on tin uses to insure supplies for the more essential needs.

* * *

TIN is one of the more important coating materials. Most of the world's production of this primary metal is used for that purpose. The coating is applied by either of two methods, the hot dip or the electrolytic process. The trend is strongly upward in the production of electrolytic tin plate in the United States. Last year about 36 per cent of the tin plate produced here was by the electrolytic process and 64 per cent was hot dipped. A projected estimate indicates that by 1950, electrolytic tinning may increase to about 66 per cent with hot dipped dropping to about 34 per cent of the total coated products made. Tin is also used in the manufacture of solder, babbitt, bronze, collapsible tubes, and a number of other important commodities.

* * *

BEFORE the war, United States manufacturers used 39 per cent of the world's total production of primary tin, and of this amount about 53 per cent was for protective coatings. On a non-restrictive basis, it is estimated tin users here will require 85,000 gross tons while world requirement will be 195,000 gross tons of primary tin annually. Some reported figures sound fantastic, such as the one that world tin consumption may some day reach 250,000 tons annually. World production of primary tin in 1946 was some 87,000 gross tons and consumption was 115,000 gross tons.

* * *

STOCKS in the United States held by private industry and the government declined approximately 14,000 tons during 1946. There will be a further decline this year. Even if controls are continued, indications are that government reserve stocks, exclusive of those held for permanent stockpiling, will be exhausted by the end of 1947. It is anticipated that

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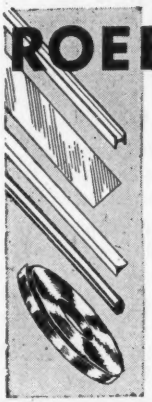
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world stocks will reach a low of about 40,000 tons by January 1, 1948. There will be a slight improvement during that year and the stock on January 1, 1949, should be about 48,000 tons. It will probably be a year later than that before we have a good world-wide supply. The progress made in rehabilitating the tin-producing countries in the Far East will determine how soon we shall return to a normal position in the United States.

* * *

SUPPLIES of the three principal coating metals used in the steel industry —lead, zinc, and tin— are today high on the list of hard-to-get metals. The conditions outlined here are world-wide in scope. Relief cannot be expected until supply and demand are in balance, and many factors are involved in shaping the answer as to how soon this balance will be attained.

* * *

Reynolds Wire at Dixon

(*Continued from page* 514)

vision. Upon Mr. Harvey's death in 1930 he was succeeded by **John Ralston** who served until his death in 1937. I did not have the pleasure of his acquaintance, and must rely on impressions gained from his associates and competitors. They picture him as a friendly man, a delightful host, an honest, square-shooting competitor whose word was better than some people's bonds. His interest and aptitude lay rather on the commercial side; he was jealous of his company's good name, and determined in upholding the quality of her product.

* * *

ON **Mr. Ralston's** death his widow, Mr. Reynolds' younger daughter **Lucile**, assumed the presidency. In his later years Mr. Reynolds' eyesight had failed and his younger daugther had travelled with him, attended conventions and sales conferences, prepared publicity, and in general acted as his eyes, so that the duties of the of-

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fice were by no means strange to her.

* * *

COMING back for the moment to the wire mill, there is practically no vestige remaining of the equipment with which it started out. The **Lindstrom-Lauren** machines were later replaced by **John Wishart.** The rod bench was rebuilt and double-decked by **Charles Trotter,** who also straight-lined the cleaning house. Annealers have undergone three transformations. A further change is on the cards, namely a replacement of all the machinery by **Vaughn** equipment. The wire mill, called plant No. 2, is a hillside plant, and advantage has been taken of that fact and gravity called upon for the replacement of a certain amount of man and horse power.

* * *

OF the weaving mill, plant No. 1, I do not intend to speak. I have had some contacts with it, indeed I have had the pleasure of solving one or two of its minor problems, but if I started discussing it I might innocently give away some secret of the mill. As a matter of fact, what is the weaving room to a wire man? Simply the place the wire goes to and the complaints come from. However I can report, for it is no secret, that the company is pulling out of the insect screen line and going in for industrial screening, and for specialty wires. During the war the company did more or less in the specialty line, particularly a .009 galvanized wire used for covering cables, and if I am not mistaken it was for the basketweave covering on the de-gaussing cables that protected ships from magnetic mines. Reynolds did about 70% of this wire.

* * *

THE present officers are **Mrs. John G. Ralston,** President, **Richard A. Joslyn,** Vice President and Secretary, **Harold Rorer,** Treasurer, **Vernon H. Duke,** Manager of Sales, and **A. Gordon Wilson,** Purchasing Agent.

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WHERE TO BUY

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ABRASIVES—
Norton Co., Worcester, Mass.

ACID INHIBITORS—
American Chemical Paint Co., Ambler, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M., Co., Pittsburgh, Pa.

ACID-PROOF CONSTRUCTION—
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corporation, Newark, Del.
Sauereisen Cements Co., Pittsburgh, Pa.

AIR DRAW FURNACES
Carl-Mayer Corp., Cleveland, Ohio.

ALKALINE CLEANERS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.

ANNEALING MACHINES—Open Flame
Syncro Machine Co., Perth Amboy, N. J.

ANNEALING POTS AND BOXES—
National Annealing Box Co., Washington, Penna.
Scudder, E. J., Foundry & Machine Co., Trenton, N. J

ARMORING EQUIPMENT—
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machinery Inc., Pawtucket, R.I.

BAKERS—Rod and Wire
Carl-Mayer Corp., The, Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
Ross, J. O. Engr. Corp., New York, N. Y.

BAR STOCK—Stainless Steel
American Rolling Mill Co., The, Middletown, Conn.
Rustless Iron & Steel Div., The American Rolling Mill Co., Baltimore, Md.

BENDERS—
O'Neil-Irwin Mfg. Co,. Minneapolis,. Minn.

BOBBINS—Braider & Wire Weaving
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire & Textile Machinery, Inc., Pawtucket, R. I.

BORAX—Wire Drawing
Pacific Coast Borax Corp., New York, N. Y.

BORON CARBIDE
Norton Co., Worcester. Mass.

BRAKES—Pneumatic
Entwistle, Jas. L. Co., Pawtucket, R. I.

BRAKES & SHEARS—
O'Neil-Irwin Mfg. Co., Minneapolis, Minn..

BRICKS—Acid Proof
Keagler Brick Co., Steubenville, Ohio.

CABLE LACQUERING OVENS
Industrial Ovens, Inc., Cleveland, O.

CABLE—Steel and Copper
Jones & Laughlin Steel Corp., Pittsburgh, Pa.

CARRIERS—Braider, High Speed
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Wire & Textile Machinery Inc., Pawtucket, R.I.

CASTINGS—Wire Mill
Scudder, E. J. Fdry. & Mach. Co., Trenton, N.J.

CEMENTS—Acid Proof
Sauereisen Cements Co., Pittsburgh, Pa.
Ceilcote Co., The, Cleveland, Ohio.

CEMENTS—Refractory
Norton Co., Worcester, Mass.

CHEMICALS—Cleaning
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M., Co., Pittsburgh, Pa.
Standard Industrial Compounds Co., Chicago, Ill.

CLEANERS—Hand and Metal
American Chemical Paint Co., Ambler, Pa.
Magnus Chemical Co., Garwood, N. J.
Apex Alkali Products Co., Phila, Pa.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

CLEANING & PICKLING EQUIP.—
Cleveland Tramrail Div., of the Cleveland Crane & Engineering Co., Wickliffe, O.
Haveg Corporation, Newark, Del.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

CLOTH TESTERS—
Scott Testers, Inc., Providence, R. I.

CLOTH—WIRE. All Metals
Reynolds Wire Co., Dixon, Ill.
Roebling's John A. Sons, Co., Trenton, N. J.

COATING COMPOUNDS—
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

COILERS—Sheet, Strip and Wire
Entwistle, Jas. L. Co., Pawtucket, R. I.
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J. Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio.

COLD HEADERS—
Waterbury-Farrel Foundry & Machinery Co., Waterbury, Conn.

COMPOUNDS—Coppering
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Metal Finishing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.

COMPOUNDS—Rust Preventing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.

COMPOUNDS—Rust Removing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Phila, Pa.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Phila., Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H. Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Pacific Coast Borax Corp., New York, N. Y.
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds, Co., Chicago, Ill.

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire & Textile Machinery Inc., Pawtucket, R.I.

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CUTTING TOOLS—Carbide
Carboloy Co., Inc., Detroit, Mich
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Vascoloy-Ramet Corp., North Chicago. Ill.

CUTTING TOOLS—Wire
Porter, H. K., Inc., Everett, Mass.

DIAMONDS—Industrial
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Champion Diamond Co., New York, N. Y.
Michigan Wire Die Co., Detroit, Mich.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Van Itallie Co., The, New York, N. Y.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside. N. J.

DIAMOND POWDERS—
Champion Diamond Co., New York, N. Y.
Michigan Wire Die Co., Detroit, Mich.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Van Itallie Co., The, New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND TOOLS—
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Diamond
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Cochaud Wire Die Corp., New York, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Michigan Wire Die Co., Detroit, Mich.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Lead Extrusion
Eastern Tungsten Carbide Co., Newark, N. J.
Robertson, John, Co., Brooklyn, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies Co., Fort Wayne, Ind.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Carboloy Co., Inc., Detroit, Mich.
Cochaud Wire Die Corp., New York, N. Y.
Eastern Tungsten Carbide Co., Newark, N. J.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Michigan Wire Die Co., Detroit, Mich.
New Eng. Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Rod and Tube Drawing
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Carboloy Co., Inc., Detroit, Mich.
Eastern Tungsten Carbide Co., Newark, N. J
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y
Metal Carbides Corp., Youngstown, O.
Michigan Wire Die Works, Detroit, Mich.
Rusch Wire Die Corp., New York, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.

DIES—Tantalum Carbide
Balloffet Dies & Nozzle Co., Inc. Guttenburg N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Rusch Wire Die Corp., Croton-on-the-Hudson, N Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.

DIES—Tungsten Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenburg, N.J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Michigan Wire Die Co., Detroit, Mich.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Tungsten Alloy Mfg. Co., Newark, N. J.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIRECT ELECTRIC RESISTANCE HEATING—
Trauwood Engineering Co., The, Cleveland Ohio.

DRAW BENCHES—
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J. Fdry. & Mach. Co., Trenton, N.J.
Vaughn Machinery Co., Cuyahoga Falls, O.

DRUMS—Flange Steel
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

DRUMS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

DRYING & PRE-HEATING ROOMS—
Carl-Mayer Corp., Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.

DRYING EQUIPMENT—
Carl-Mayer Corp., The, Cleveland, Ohio.
Ross, J. O. Engr. Corp., New York, N. Y.

ENGINEERS—Consulting Wire Mill
Lewis, Kenneth B., Worcester, Mass
Syer, C. Raymond, Westport, Conn.

EQUIPMENT—Insulation Testing
Entwistle, James L., Co., Pawtucket, R. I

EYELETS—Brass or Zinc
Platt Bros., & Co., The, Waterbury, Conn.

WHERE TO BUY, Continued

FLUXES—Soldering
American Chemical Paint Co., Ambler, Pa.

FOAM PRODUCING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Parkin, Wm. M. Co., Pittsburgh, Pa.

FRICTION PAY-OFF STANDS—
Industrial Ovens, Inc., Cleveland, Ohio.

FURNACES—Annealing
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Furnace Engrs. Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engineering Co., The, Cleveland Ohio.
Wilson, Lee Engr. Co., Cleveland, Ohio

FURNACES—Automatic
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Brazing
Electric Furnace Co., Salem, Ohio.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.

FURNACES—Bright Annealing
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Electric
Eisler Engineering Co., Newark, N. J.
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Galvanizing Equipment
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Hard'ing & Temp'ing
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engineering Co., The, Cleveland Ohio.

FURNACES—Lead Melting
Electric Furnace Co., Salem Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Robertson, John, Co., Brooklyn, N. Y.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Non-Oxidizing
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Normalizing
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Salt Bath
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corporation, Toledo, O.

FURNACES—Wire, Strip & Sheet
Carl-Mayer Corp., The, Cleveland, Ohio.
Eisler Engineering Co., Newark, N. J.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corporation, Toledo, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

GALVANIZING KETTLES
National Annealing Box Co., Washington, Pa.

GRINDERS—Roll
Norton Co., Worcester, Mass.

HOISTS—Electric Travelling
Cleveland Tramrail Div. of Cleveland.
Crane & Engineering Co., Wickliffe, Ohio.

INHIBITORS—Pickling
American Chemical Paint Co., Ambler, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M. Co., Pittsburgh, Pa.

INSULATING LACQUERING SYSTEMS—Continuous
Industrial Ovens, Inc., Cleveland, Ohio.

INSULATING MATERIALS—
Du Pont, E. I., de Nemours Co., Wilmington, Delaware.
Owens-Corning Fiberglas Corp., Toledo, Ohio.
Perfect Thread Co., Inc., Brooklyn, N. Y.
Standard Varnish Wks., Staten Island, N. Y.

KETTLES—Galvanizing, Annealing, Tinning, etc.
National Annealing Box Co., Washington, Penna.

LATHES—Die Reaming
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Morgan Construction Co., Worcester, Mass.
Roos, H. & G., Tool & Mfg. Co., Montclair, N.J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Machine Co., Waterbury, Conn.

LININGS—Acid and Alkali Proof
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corporation, Newark, Del.

LUBRICANTS—For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

LUBRICANTS—Wire Drawing
Apex Alkali Products Co., Phila., Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Bale Tie
Reed and Richards Transatlantic, Inc., New York, N. Y.

MACHINERY—Braiding
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Wire & Textile Mach'y, Inc., Pawtucket, R. I.

MACHINERY—Brazing
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Bunching
American Insulating Mach'y Co., Phila, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machinery Inc., Pawtucket, R.I.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cable, Rope Closing
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Coil Winding
Entwistle, Jas. L. Co., Pawtucket, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Coilers
Eisler Engineering Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
Morgan Construction Co., Worcester, Mass.
New England Butt Co., Providence, R. I.
Ruesch, H. J. Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Waterbury Farrel Fdry. & Mach. Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio.
Wire & Textile Machinery Inc., Pawtucket, R.I.

MACHINERY—Copper Wire Drawing and Rolling
American Insulating Mach'y Co., Phila, Pa.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire
American Insulating Mach'y Co., Phila, Pa.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cutting
Eisler Engineering Co., Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio.
National Mach'y Exch., (Used), New York, N.Y.
Porter, H. K. Inc., Everett, Mass.
Shuster, F. B. Mfg., Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Die Making
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Roos, H. & G., Tool & Mfg. Co. Montclair, N.J.
Union Wire Die Co., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

MACHINERY—Draw Benches
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Edging
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Industrial Ovens, Inc., Cleveland, O.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Extruding
Robertson John, Co., Brooklyn, N. Y.
Royle, John, & Sons, Paterson, N. J.
Wire & Textile Machinery Inc., Pawtucket, R.I.

MACHINERY—Fence
Glader, Wm. Machine Works, Chicago, Ill.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Filament Coil Winding
Eisler Engineering Co., Newark, N. J.

MACHINERY—Flat Wire
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Forming
Eisler Engineering Co., Newark, N. J.
National Mach'y Exch. (Used), New York, N. Y.
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.
Reed and Richard Transatlantic, Inc., New York, N. Y.
Seifert, E. R., Inc., Syracuse, N. Y.
Sleeper & Hartley, Inc, Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Galvanizing
Wilson, Lee, Engr. Co., Cleveland, Ohio.

MACHINERY—Galvanizing Wire
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

MACHINERY—Gang Winders
Entwistle, Jas. L. Co., Pawtucket, R. I.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co, Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., Worcester, Mass.

MACHINERY—Insulating
American Insulating Mach'y Co., Phila, Pa.
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lead Encasing Presses, etc.
Robertson, John Co., Brooklyn, N. Y.

MACHINERY—Lead Stripping
Robertson, John Co., Brooklyn, N. Y.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Magnet Wire
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Material Handling
Cleveland Tramrail, Div. of the Cleveland. Crane & Engineering Co., Wickliffe, O.

MACHINERY—Measuring Wire & Cable
Durant Mfg. Co., Milwaukee, Wis.
Entwistle, Jas. L. Co., Pawtucket, R. I.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

WHERE TO BUY, Continued

MACHINERY—Nail and Tack
Glader, Wm. Machine Works, Chicago, Ill.
National Mach'y Exch. (Used), New York, N.Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Panning
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Perth Amboy, N. J.
Wire & Textile Machinery Inc., Pawtucket, R.I.

MACHINERY—Pointing
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Mach., Co., Trenton, N.J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machinery Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Rod Mill
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Rolling Mill
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N.Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Foundry & Machinery Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Rubber for Insulating Wire
Royle, John & Sons, Paterson, N. J.
Wire & Textile Machinery Inc., Pawtucket, R.I.

MACHINERY—Rubber Tubing and Straining
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wire & Textile Machinery Inc., Pawtucket, R.I.

MACHINERY—Screw Wire
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc, Worcester, Mass.

MACHINERY—Special
American Insulating Mach'y Co., Phila, Pa.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
New England Butt Co., Providence, R. I.
Ruesch, H. J., Machine Co., Newark, N. J
Scudder, E. J., Fdry. & Mach., Co., Trenton, N.J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Spooling
American Insulating Mach'y Co., Phila., Pa.
Boyd, Charles P., Corp., Philadelphia, Pa.
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N .J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machinery Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc., Pawtucket, R. I.

MACHINERY—Spring Making
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Staple
Reed and Richards Transatlantic, Inc., New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Lewis Machine Co., The, Cleveland, Ohio.
National Mach'y Exch. (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J
Shuster, F. B., Mfg. Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Stranding
Huhgesville Machine & Tool Co., Hughesville, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Strip Steel
Ruesch, H. J., Machine Co., Newark, N. J.
Steel Equipment Co., Cleveland, Ohio.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Swaging
National Mach'y Exch. (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J
Sleeper & Hartley Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N .J.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N .J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machinery Inc. Pawtucket, R.I.

MACHINERY—Testing Equipment—Sparkers
Entwistle, Jas. L., Pawtucket, R. I.
Wire & Textile Machinery Inc., Pawtucket, R.I.

MACHINERY—Tinning Wire
American Insulating Mach'y Co., Phila, Pa.
New England Butt Co., Providence, R. I.
Steel Equipment Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Welding Wire
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Winding
American Insulating Mach'y Co., Phila., Pa.
Eisler Engineering Co., Newark, N. J.
New England Butt Co., Providence, R. I.
Sleeper & Hartley Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wind-up (Constant Tension, Variable Speed)
Industrial Ovens, Inc., Cleveland, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Bending
Eisler Engineering Co., Newark, N. J.
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

MACHINERY—Wire Drawing
American Insulating Mach'y Co., Phila, Pa.
Eisler Engineering Co., Newark, N. J.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Mach., Co., Trenton, N.J.
Sleeper & Hartley, Inc, Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J .

MACHINERY—Wood Screw
National Mach'y Exch. (Used), New York, N. Y.

MATERIAL HANDLING EQUIPMENT
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

MILLS—Tandem Rolling and Edging
Torrington Mfg. Co., Torrington, Conn.

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.

NICKEL SILVER AND PHOSPHOR BRONZE—Rod, Wire and Strip
Hudson Wire Co., Ossining, N. Y.

OILS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

OVENS—Cable Lacquering
American Insulating Mach'y Co., Phila., Pa.
Industrial Ovens, Inc., Cleveland, Ohio.

OVENS—Dehydrogenizing
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.

OVENS—Industrial
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.
Ross, J. O. Engr. Corp., N. Y., N. Y.

OVENS—Welding Rod Coating
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.
Ross, J. O., Engr. Corp., New York, N. Y.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.

PAINTS—Marine
American Chemical Paint Co., Ambler, Pa.

PAINTS—Structural Steel
American Chemical Paint Co., Ambler, Pa.

PANS—Lead and Spelter
National Annealing Box Co., Washington, Penna.

PANS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

PAPER—Creped Wrapping
Crepe-Kraft Co., Newark, N. J.

PAPER—For Coil Wrapping and Corrosion Prevention
Crepe-Kraft Co., Newark, N. J.

PAPER TESTERS—
Scott Testers, Inc., Providence, R. I.

PATENT ATTORNEYS—
Lancaster, Allwine and Rommel, Washington, D.C.

PICKLING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Phila., Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M., Co., Pittsburgh, Pa.

PICKLING TANK LININGS—
Ceilcote Co., The, Cleveland, Ohio.
Sauereisen Cements Co., Pittsburgh, Pa.
Haveg Corporation, Newark, Del.

PIPES & FITTINGS—Acid Resistant
Ceilcote, Co., The, Cleveland, Ohio.
Haveg Corporation, Newark, Del.

PLASTIC TESTERS—
Scott Testers, Inc., Providence, R. I.

POTS—Lacquer
Industrial Ovens, Inc., Cleveland, Ohio.

POTS—Lead Melting
National Annealing Box Co, Washington, Pa.
Robertson, John, Co., Brooklyn, N. Y.

POWDER—Wire Drawing
Apex Alkali Products Co,. Phila, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

PRESSES—Hydraulic and Mechanical
Robertson, John, Co., Brooklyn, N. Y.

PRESSES—Lead
Robertson, John, Co., Brooklyn, N. Y.

PRESSURE VESSELS—
National Annealing Box Co., Washington, Penna.

PULLERS—Wire
Scudder, E. J., Fdry. & Mach., Co., Trenton, N.J.
Sleeper & Hartley, Inc, Worcester, Mass.

PUMPS—Hydraulic
Robertson, John, Co., Brooklyn, N. Y.

REELS—Annealing and Stranding
Howsam Spool Co., Aurora, Ill.

REEL AND TENSION STAND—
Industrial Ovens, Inc., Cleveland, Ohio.
Sleeper & Hartley, Inc, Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

REEL CRUTCHES—
Watson Machine Co., Paterson, N. J.

REELS—Annealing and Stranding
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

WHERE TO BUY, Continued

REELS—Collapsible
Entwistle, Jas. L. Co., Pawtucket, R. I.

REELS—Steel
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS AND SPOOLS—Shipping and Shop
Apco Mossberg Co., Attleboro, Mass.
Bridge Manufacturing Co., Hazardville, Conn.
Howsam Spool Company, Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.
Wire & Textile Machinery Inc., Pawtucket, R.I.

REELS—Takeoff
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Shuster, F. B., Mfg. Co., New Haven, Conn.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS—Vulcanizing & Impregnating
Apco Mossberg Co., Attleboro, Mass.
Hayward, R. B. Co., Chicago, Ill.
Howsam Spool Company, Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS—Wire Drawing
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Company, Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div. Republic Steel Corp., Niles, Ohio.

REELS—Wooden
Bridge Mfg. Co., The, Hazardville, Conn.
Durkee Mfg. Co., Pine River, Minn.

REFRACTORIES—High Temperature
Norton Company, Worcester, Mass.

ROD BAKERS—
Carl-Mayer Corp., The, Cleveland, Ohio.
Ross, J. O. Engr. Corp., New York, N. Y.

RODS—Stainless Steel
American Rolling Mill Co., The, Middletown, Conn.
Rustless Iron & Steel Div., American Rolling Mill Co., The, Baltimore, Md.

RODS—Wire—Non-Ferrous
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Wire—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co. Peoria, Ill.
Roebling's John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

ROPE—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.

RUBBER AND RUBBER COMPRESSION TESTERS—
Scott Testers, Inc., Providence, R. I.

RUST PROOF COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.

RUST REMOVING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Standard Industrial Compounds Co., Chicago, Ill.

SATURATION SYSTEMS
Industrial Ovens, Inc., Cleveland, Ohio.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machinery Inc., Pawtucket, R.I.

SHEARS—
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

SHEET—Steel
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

SOAPS—Industrial and Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R H. Co., Inc., Homer, N. Y.
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

SOLVENT RESIN SYSTEMS—Experimental
Industrial Ovens, Inc., Cleveland, Ohio.

SPOOLS—Annealing and Wire Drawing
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Company, Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

SPOOLS—Shipping and Shop
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Company, Aurora, Ill.
Hubbard Spool Company,. Chicago, Ill
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

SPOOLS—Steel
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

SPRINGS—Tools for Forming
State Machine Tool Co., Hartford, Conn.

STAMPINGS—Steel
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Brass and Non-Ferrous
Hudson Wire Co., Ossining, N. Y.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

SWIFTS—Take-off
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Watson Machine Co., Paterson, N. J.

TANK LININGS—Brick
Ceilcote Co., The, Cleveland, Ohio.
Keagler Brick Co., Steubenville, Ohio.

TANK—Compound
Haveg Corporation, Newark, Del.
Watson Machine Co., Paterson, N. J.

TANKS—Pickling
Ceilcote Co , The, Cleveland, Ohio.
Haveg Corporation, Newark, Del.
Sauereisen Cements Co., Pittsburgh, Pa.

TANKS—Steel
Mossberg Pressed Steel Corp., Attleboro, Mass.
National Annealing Box Co., Washington, Penna.

TOOLS—Wire Cutting
Porter H. K., Inc., Everett, Mass.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div of the Cleveland Crane & Engineering Co., Wickliffe, O.

TRAVERSES—For Reels
Entwistle, James L. Co., Pawtucket, R. I.
Hubbard Spool Company, Chicago, Ill.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

TRAVERSE MECHANISMS—
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machinery Inc., Pawtucket, R.I.

TREADS—Safety
Norton Co, Worcester, Mass.

TUBE BENDERS AND FORMERS—
Ruesch, H. J. Machine Co., Newark, N. J.

VALVES & FITTINGS—Acid Resistant
Haveg Corporation, Newark, Del.

VARNISHES—For Insulation
Standard Varnish Wks., Staten Island, N. Y.

VULCANIZERS—
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.

WIND-UP AND UNWIND SYSTEMS—Continuous
American Insulating Mach'y Co., Phila, Pa.
Entwistle, James L. Co., Pawtucket, R. I.
Industrial Ovens, Inc., Cleveland, O.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machinery Inc., Pawtucket, R.I.

WIRE—Aluminum
Aluminum Co. of America, Pittsburgh, Pa
Malin & Co., Cleveland, Ohio.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Cold Heading
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's John A., Sons Co., Trenton, N. J.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
U. S. Steel Export Co., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O

WIRE—Electric
Hudson Wire Co., Ossining, N. Y.
Malin & Co., Cleveland, Ohio.

WIRE—Enameled for Coils
North American Philips Corp., New York, N. Y.
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Manufacturers
American Steel & Wire Co., Cleveland-Chicago-New York.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Reynolds Wire Co., Dixon, Ill.
Roebling's, John A., Sons Co., Trenton, N. J.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
U. S. Steel Export Co., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Music
Ecca Machine Corp., New York, N. Y.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Malin & Co., Cleveland, Ohio.

WIRE—Nickel Silver and Phosphor Bronze
Hudson Wire Co., Ossining, N. Y.
Malin & Co., Cleveland, Ohio.

WIRE—Non-Ferrous to Specification for Special Purposes
Anchor Wire Corp., Jamaica, N. Y.
Hudson Wire Co., Ossining, N. Y.
Winsted Div. of Hudson Wire Co., Winsted Conn.

WIRE—Spring
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Stainless Steel
American Steel & Wire Co., Cleveland-Chicago-New York.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.

WIRE—Steel—Also Coppered Steel—Also Galvanized Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WIRE CLOTH—Industrial
Roebling's John A., Sons Co., Trenton, N. J.
Reynolds Wire Co., Dixon, Ill.

WIRE TESTERS—
Scott Testers, Inc., Providence, R. I.

WIRE, WEAVING—Non-Ferrous
Hudson Wire Co., Ossining, N. Y.
Reynolds Wire Co., Dixon, Ill.

WRAPPING PAPER—Creped
Crepe-Kraft Co., Newark, N. J.

YARNS & TAPES
Du Pont, E. I. de Nemours Co., Wilmington, Delaware.
Owens-Corning Fiberglas Corp., Toledo, Ohio
Perfect Thread Co., Inc., Brooklyn, N. Y.

YARN TESTERS—
Scott Testers, Inc., Providence, R. I.

The WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON 3, NEW JERSEY, U. S. A.

Wire & Wire Products

July, 1947

ELECTRICAL WIRE AND CABLE AND WIRE ROPE MACHINERY

RIGID-FRAME HORIZONTAL STRANDERS TYPE "RH"

These Stranders are the preferred medium for producing Soft Copper Multiple-Layer Concentric Strand of round or sector shape.

PRINCIPAL ADVANTAGES

Strand of a quality equal to that obtainable from planetary equipment is produced in about HALF OF THE TIME while First Cost, Floor Space and Power Requirements are only about TWO THIRDS of planetary types of comparable size and purpose. Equally suitable for all wires of similar ductility such as Aluminum which, because of lessened spool load, can be stranded at still higher speeds. Maintenance is practically NIL.

DESIGN and CONSTRUCTION

Single Disc design for up to 10" spool heads. Multiple Disc design for up to 22" spool heads. Overhung spool mount allows utmost freedom and rapidity in loading and threading and also full visibility during operation. All Steel and fully "anti-friction" bearing. Fully enclosed and force-feed lubricated drive and change gearing. Large, end-bearing-supported, hollow main shaft. Spool-Twist-Latches with automatic electric latch stop preventing machine operation with latches open. AIR-OFF Brakes. Space for sector-rolling and side tables for transfers. Unbalance allowed for. Lead-thru nests. Adjustable double-shoe spool frictions. Wire Guides guarded against run-off. Pre-spiraling die holders where required.

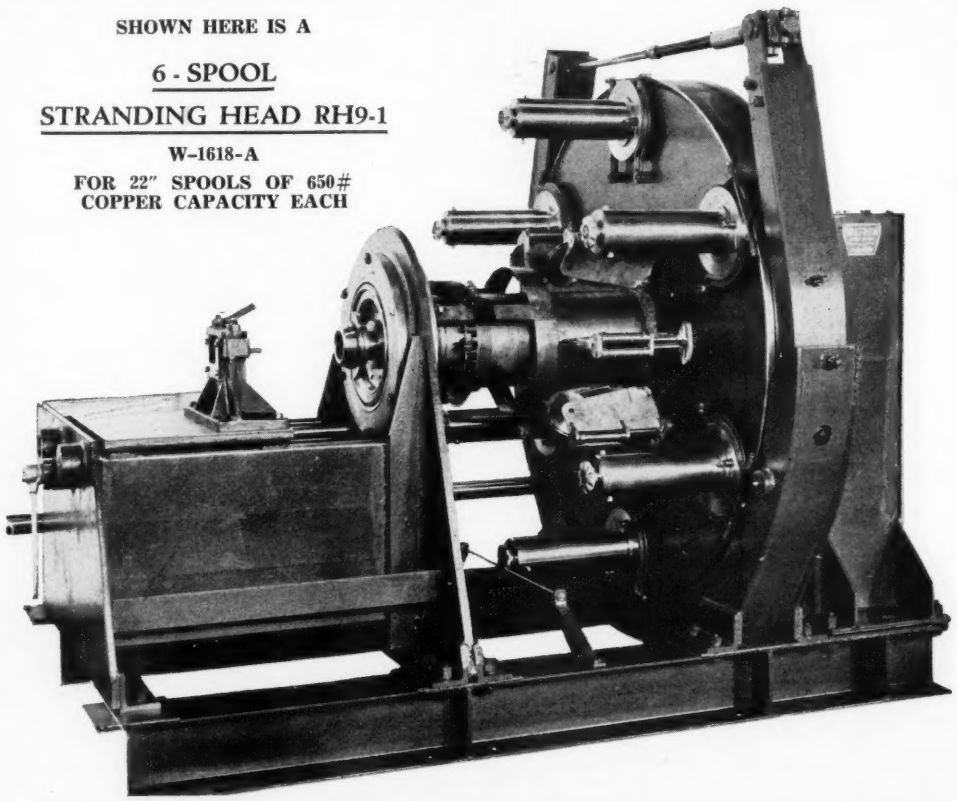
SHOWN HERE IS A

6 - SPOOL

STRANDING HEAD RH9-1

W-1618-A

FOR 22" SPOOLS OF 650# COPPER CAPACITY EACH



SIZES and APPLICATIONS

Generally available for 6", 10", 16", 22" and intermediate size dia. spools in Heads grouping 6, 12, 18, 24, 30, 36 and 42 Spools. All sizes are principally designed for concentric-layer stranding but the smaller heads are also much in demand for applying the bare-neutral layer in Service Entrance Cables. Large machines are frequently built in Tandem Arrangement which permits head groups to operate as separate stranders independent from each other, each with its own capstan and takeup, or the entire aggregate may operate as one larger strander whenever required.

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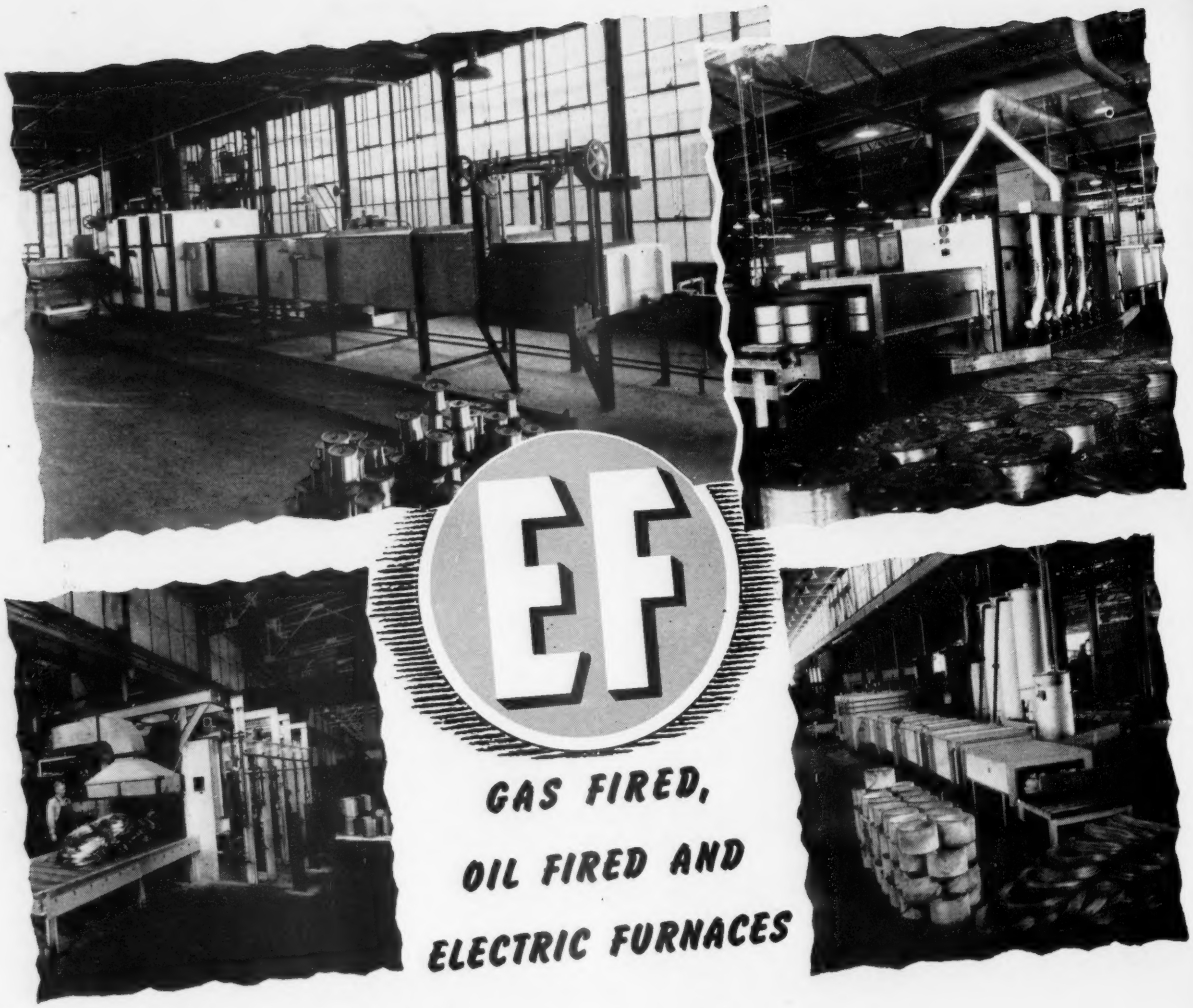
For data and size tabulation request our Machine Bul. 093043.



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